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6" jointers face off

September 2001
ISSUE 135

Tips, Tools, Techniques, and Projects for Woodworkers

easy-to-make sleigh bed

build the first of a 5-piece matching set

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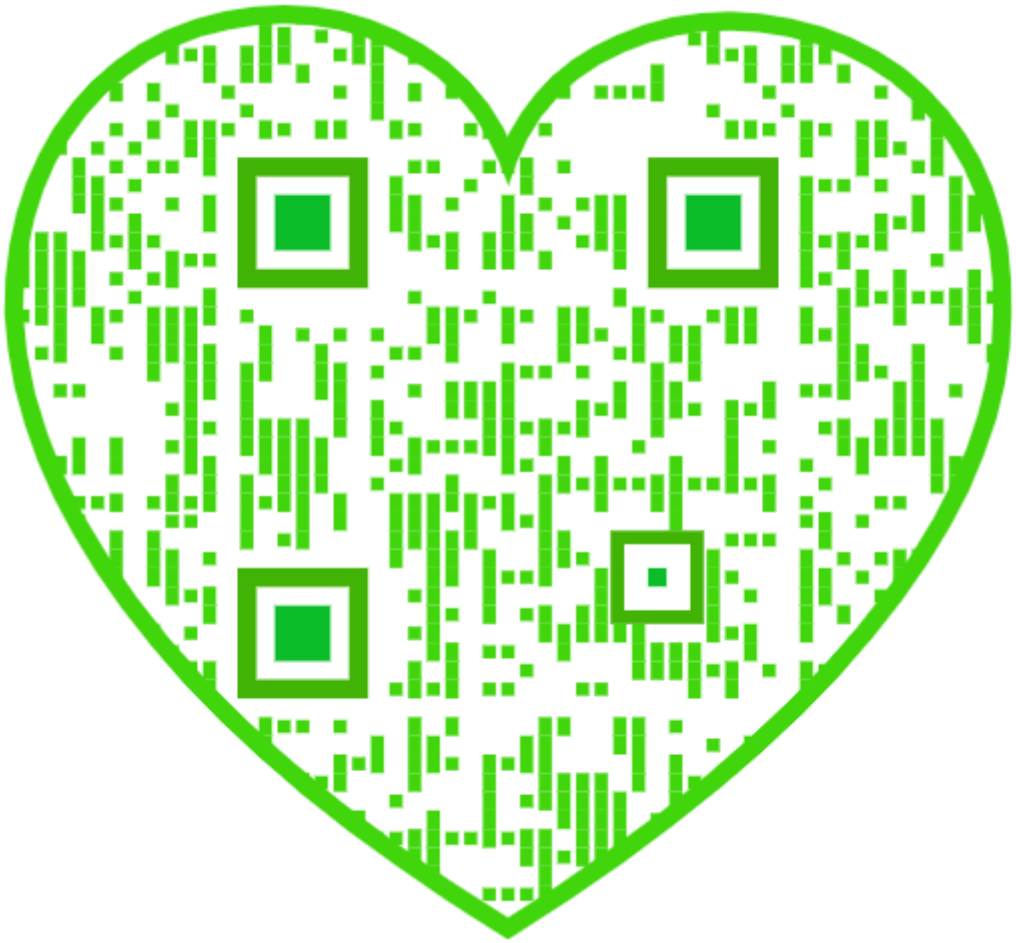

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Sleigh bed cover photo: Andy Lyons

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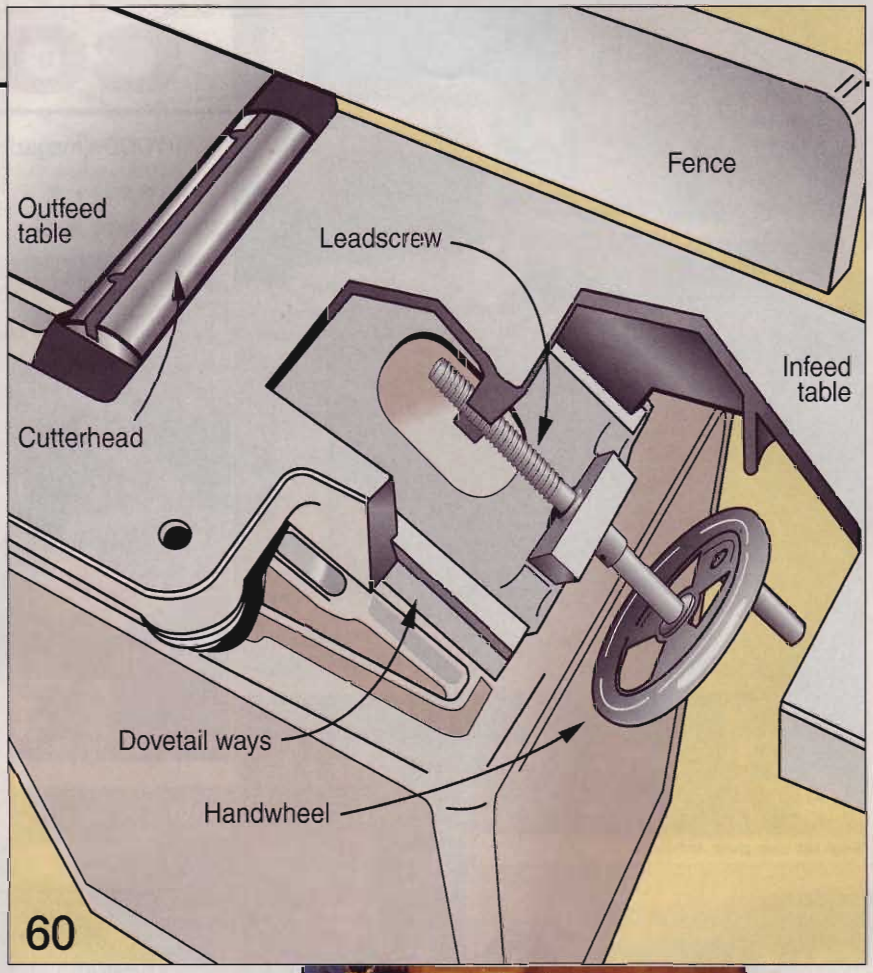

Better Homes and Gardens® WOOD® magazine (ISSN-0743-894X) is published nine times a year in February, March, April, May/June, July/August, September, October, November, and December by Meredith Corporation, 1716 Locust St., Des Moines, IA 50309-3023. Periodicals postage paid at Des Moines, Iowa, and additional mailing offices. Better Homes and Gardens trademark registered in Canada and Australia. Marca Registrada en México. **ONE-YEAR SUBSCRIPTION PRICES:** U.S. and its possessions, $28; Canada, $41; other countries, $49. Canada Post Publications Mail Sales Product Agreement No. 1369350. Canadian BN 12348 2887RT. **CANADIAN RETURN ADDRESS:** *Better Homes and Gardens WOOD* magazine, 2744 Edna Street, Windsor, Ontario, N8Y 1V2. **POSTMASTER:** Send address changes to *Better Homes and Gardens WOOD* magazine, P.O. Box 37439, Boone, IA 50037-0439.

editor's angle

let me tell you about the new guy

In the last issue of the magazine, I was so excited to fill you in about our GREAT AMERICAN WORKSHOPS CONTEST™, cosponsored by DeWalt, that I neglected to pass along one important piece of information. I'm new here.

New to the job of Editor-In-Chief that is, not new to *WOOD*® magazine. For the past 13 years, I wrote tool-review, woodworking-technique, and project articles. Now that I've been entrusted with the overall editorial direction of your magazine, I'm guessing you might want to know more about what makes me tick.

Like you, there's nothing I would rather do than build something beautiful out of wood. Although I've made many projects from past issues of *WOOD* magazine, I've also managed to produce my fair share of firewood from stock intended for other purposes, such as furniture. Yes, I'm still learning. Fortunately, I'm surrounded by a staff of woodworkers, designers, writers, and artists whose talents are second-to-none. In the months ahead I hope to give you sneak peeks into how these unique individuals do their jobs. I'm always amazed with the imaginative things they come up with, and I think you'll find it interesting reading.

Besides woodworking, all of us on the staff share another passion: producing the most informative, inspirational, and entertaining woodworking magazine anywhere. We aim to bring you only projects of good taste, ones that you'll find useful and practical to build. Every issue should deliver skills that make the most of your tools and materials, and product reviews that help you squeeze maximum value from your hard-earned cash. And, you'll gain insights from other craftsmen that you can put to immediate use in your shop. You deserve nothing less.

Now, I'm interested in getting to know you a little more. When you have a second, please jot down your thoughts about *WOOD* magazine, and how we can serve you better. How do you feel about our project selection? Is there a great project we've overlooked? How about the complexity of our projects, tips, and techniques? Too hard, too easy, or just right? I promise to read each and every letter, pass your comments along to the staff, and give your suggestions due consideration during our planning sessions. Send your correspondence to me at 1716 Locust St., GA310, Des Moines, IA 50309-3023. Or, send e-mail to woodmail@mdp.com.

Oh yes, about the GREAT AMERICAN WORKSHOPS CONTEST—the entry deadline is October 1, 2001, so you still have plenty of time to enter. (See *pages 24* and *25* of the August issue, or go to http://woodmagazine.com/misc/wkshop_contest/ for contest rules and an entry form.) But don't delay—you could win some of the $10,000 in free tools.

Bill Krier

Better Homes and Gardens®
WOOD®

September 2001 • Vol. 18, No. 6 • Issue No. 135

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talking back

Our bulletin board for letters, comments, and timely updates

If a wood truck could truck wood

The Finishing Touches article in issue 125, "How much wood can a wood truck truck?" prompted me to dig out these pictures taken in 1950 of my father's logging operation near Eugene, Oregon. The trucks in the photos are gasoline-fueled 1947 Whites.

I think that green Douglas fir weighs about 8 pounds per board foot. If Al Guenther's guess that the log in his picture contains 28,000 board feet is right, the log would weigh approximately 224,000 pounds. An 18-wheeler log truck normally hauls a 50,000-pound load.

Logs are kept from rolling off a trailer's log bunks by caulk blocks. (Loggers call them cheese blocks.) Notice that in Al's picture in issue 125, the cheese blocks are set at the ends of the bunks, which are 8' wide, the width of the truck. The normal sawmill lengths for logs are 32' and 40'. An 8'-diameter log 32' long, contains 14,560 board feet, and would weigh 116,480 pounds. I question whether the springs and tires on that truck could handle even this much weight.

By the way, the private timberland shown in the photos grew back with Douglas fir and was reharvested in recent years. It was replanted and is growing its third crop of Douglas fir timber. Loggers now do a better job of stream, wildlife, and soil protection, and utilize more of every tree cut.

—*James Lemery, Roseburg, Ore.*

Right: **A winch, two big logs, and a lot of wire rope make an on-site crane for loading logs and positioning a trailer.** ***Below:*** **Logs carry more logs over a stream.**

We checked with the USDA Forest Products Lab in Madison, Wisconsin, and they corroborated your figure of 8 pounds per board foot for green Douglas fir. In fact the number they gave us is 8.216 pounds per board foot. At this rate, a 6'-diameter log, 32' long would weigh about 65,000 pounds, probably closer to the truth. Even so, the limiting factor would not necessarily be the carrying capacity of the truck, but the load rating of the roads and bridges.

The classic woody rides again

After getting the urge to build another classic woody from way back in issue 31, I discovered that the laser-cut spoked-wheel inserts are no longer available from the original supplier. I found another company with a computerized laser cutter that was willing to cut the parts for me. They made a pattern and will supply inserts

Continued on page 10

for anyone else who wants to resurrect this great project.

—Bill Bomgaars, LeMars, Iowa

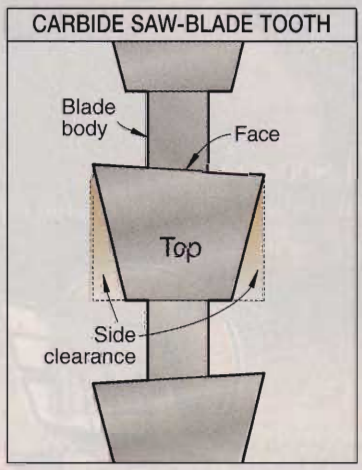
We talked to Mike Driscoll at Drico Products in LeMars, Iowa. They'll provide a set of six spoked-wheel inserts and a photocopy of the article for $7 ppd. (Iowa residents add sales tax.) Call toll-free, 888/577-3257 for credit card orders, or go to www.dricoproducts.com.

Saw blade cleanliness is next to sharpness

I'd like to add to the discussion of the causes of burning when ripping stock on your tablesaw that appeared in Hot Off the Internet in issue 123. In my 22 years of running a sharpening service, I've learned that resin buildup on the sides of the teeth can cause burning. The teeth on regular carbide blades are ground to provide .015–.020" side clearance, shown exaggerated in the drawing *below*. Thin-kerf blades have about .010" clearance. It doesn't take much resin buildup to lose this clearance, especially when working with softwoods. Once the buildup is the same width as the face of the tooth, the blade will burn, even if the tooth is sharp. Periodic cleaning with blade cleaner to remove this resin buildup results in smoother sawing.

—Clete Gillis, Rhinelander, Wis.

Clete runs Gillis Sharp Service and specializes in sharpening carbide tooling.

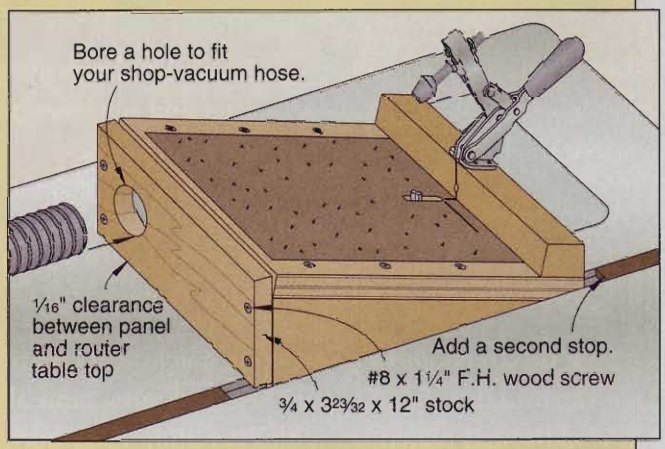


Dust collection for the pocket-hole jig

I'm one of the happy users of David Brunson's router table pocket-hole jig from Great Ideas in issue 124. As we are all prone to do, I made a couple modifications, shown in the drawing at *right*.

First, I enclosed the jig's end with a plywood panel and bored a hole to accept my shop vacuum hose. Then I added a second stop in the miter gauge slot to prevent me from accidentally cutting through the panel.

—Royall Clark, Brookings, Ore.


Bore a hole to fit your shop-vacuum hose.
1/16" clearance between panel and router table top
Add a second stop.
#8 x 1¼" F.H. wood screw
¾ x 3 23/32 x 12" stock

Adjustment info for Delta drum sander

In the issue 130 tool review of drum sanders, you listed Delta's customer service phone number for obtaining a technical bulletin on adjusting the table of the Delta 31-250 drum sander. I called the number and was told that there was no such bulletin. I would like to get a copy for future reference. Can you help?

—Duane, via e-mail

Rather than calling Delta's customer service number, listed in the article, try Delta's technical assistance line at 800/223-7278.

—Dave Campbell, WOOD® Products Editor

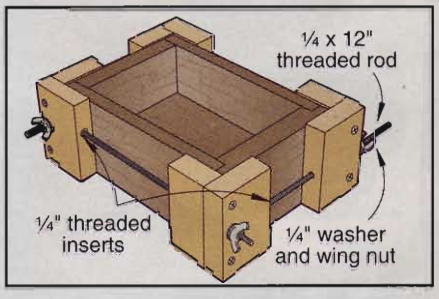
Ready-made dehumidifier for your shop

WOOD Forum in issue 131 mentions hanging a burlap bag full of calcium chloride over a bucket to dehumidify an unheated shop and prevent rust on the machinery. There is a handy prepackaged version of this called Dri-Z-Aire. I use it in my RV when it is in storage. Dri-Z-Aire is bagged calcium chloride pellets in a plastic basket with built-in drip tray. The product is readily available at RV supply stores.

—Sam Shanman, Studio City, Calif.

Modification gives clamps even tension

A shop tip in issue 125 shows how to make a simple four-corner frame



clamp. Because I make a lot of small boxes, I decided to make some of these clamps, but with one small change. I installed a threaded insert in one leg of each corner, aligning it with the threaded rod. This gives me more even clamping pressure and does away with one wing nut in each corner.

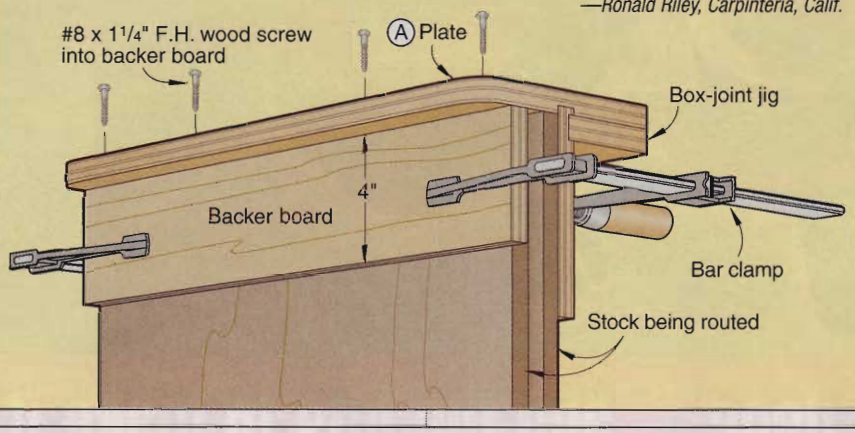
—Stewart Reid, Trenton, Ont.

Continued on page 12

Backer board eliminates box-joint chipping

I made the box-joint jig featured in issue 127. Although it didn't take long to master its use, I noticed that the router bit was tearing out wood fibers on each pass. In fact, tear-out is evident in the photo on page 66 of the article. A backer board seemed to be the solution. I clamped a piece of ¾" birch plywood about 4" wide over the two workpieces, then fastened it to the plate (A) with a couple of screws, as shown in the drawing. Now when the jig is in place, the clamps hold the backer tight to the work, and no more tear-out. Thanks for another useful jig to hang on my shop wall.

—Ronald Riley, Carpinteria, Calif.



Whole-shop air cleaner needs a bigger duct

The whole-shop air-cleaning system featured in issue 120 is a great idea at a very reasonable price. However, the 3¼×12" duct you used is less than half the size needed to handle the volume of air pulled by the blower you specified. I built mine with a 10×12" duct.

—George Whitney, Gravois Mills, Mo

Write Us!

Do you have comments, criticisms, suggestions, or maybe even a compliment specifically related to an article that appeared in *WOOD*® magazine? Please write to:

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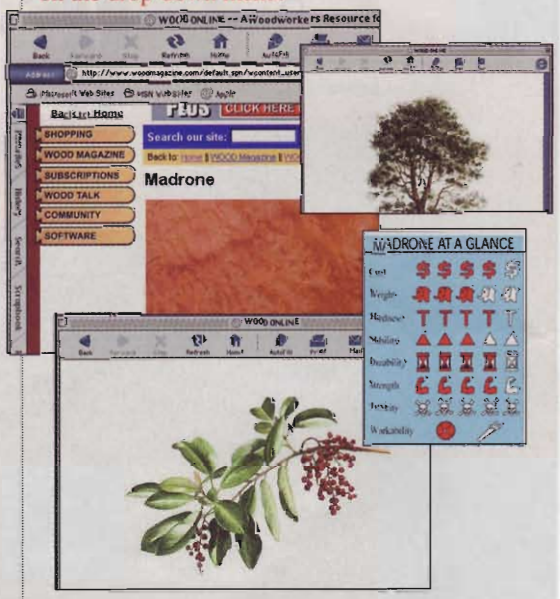
Get the scoop on nearly 30 important woods

To build projects successfully, you have to understand the material you're working with. Of course, various species of wood differ greatly in their appearance, best uses, and machining methods. So, before you tackle a new wood, check out the Wood Profiles section. You'll find information on identifying, purchasing, and working with key domestic and imported hardwoods and softwoods. Go to woodonline.com, click on the WOOD MAGAZINE button on the left-hand side of the page, then click on Wood Profiles on the drop-down menu.



ask wood

Answers to your questions from letters, e-mails, and WOOD ONLINE®

Does spalting weaken wood?

Q I recently purchased spalted maple to make a sewing machine cabinet. Does the spalting process weaken the wood enough so that it will no longer hold screws, plane adequately, etc., for furnituremaking?

—Ron Stewart, Franklin, N.C.

A "Spalting" is actually the natural process of wood decaying. In some light-colored woods, such as maple, the fungi moving through the wood leaves calligraphy-like marks also called "zone lines." The strength of the wood is determined by how much decay has occurred. I turn lots of spalted maple that I harvest here in Iowa. Punkiness is more of a problem than loss of strength. If the stock is cut thin (less than ½"), it sometimes can crack at a zone line if enough pressure is applied.

I have seen lots of beautiful furniture made from spalted wood. Because spalting is different in each piece of wood, you'll need to make your own determination as to the strength of the wood. Although I have never seen any medical evidence about the risks of breathing airborne wood fungi, I recommend wearing a mask when working with spalted wood, especially when sanding it.

—Marlen Kemmet, WOOD® *magazine*

A Punky spalted wood sucks up the finish, which makes finishing difficult. Getting a smooth surface on the punky parts can be tricky, too.

—Kenneth Anderson, San Antonio, Texas

How long do exotic colors last?

Q How long does it take for bright, colorful woods, such as Osage orange and purpleheart, to change colors? Are we talking about days, months, or years?

—Dick Watson, Los Molinos, Calif.

A Dick, we checked with exotic wood expert Keith Stephens, president of Woodworkers Source in Phoenix, and he says that some woods can change very quickly. The rate depends on the amount of exposure to light, but Osage orange can go from bright yellow to russet brown in less than 6 months, even indoors. Padauk, as another example, can dim from bright orange to a reddish-brown in just a few weeks.

As for purpleheart, the heartwood actually is a dull brown while it's inside the tree, then turns a vivid purple when cut and exposed to air. It darkens over time, but more slowly, as you can see in our samples *below*.

*—*WOOD *magazine*

We laid a ruler on these wood samples, and left them in the light. In a few weeks' time, the exposed areas began to darken noticeably.

A Purpleheart seems to last the longest of the woods that change noticeably. My purpleheart pieces still look great after about four years. Osage orange still retains a lot of yellow but is not nearly as bright as originally. It's taking on a real pleasant tan. Padauk seems to go quite rapidly although I like the deep burgundy it changes to. Ultraviolet (UV) light, which is present in sunlight, speeds up the change, so avoid it if possible, or use a finish that provides more UV protection.

—John C. Lucas, Cookeville, Tenn.

A I turned two decorative purpleheart bowls about nine months ago. I sanded each to either 1,000 or 1,500 grit and did not put a finish on them, as I didn't want to lose or deepen the color.

On the foot of one of the bowls, I intentionally left one ring unsanded. The vibrant color of purpleheart has maintained itself on both of the pieces, except for the unsanded part, which has now turned brown.

About eight years ago, I bought an expensive, multi-trayed jewelry box made of purpleheart and spalted maple. After a cou-

Continued on page 18

ple of years, the purpleheart started turning brown. But to this day whenever I open up the box, it's still the beautiful purple color on the inside.

—Jay Patel, Fremont, Calif.

Where can I find bat blanks?

Q I would like to find some 12/4 white ash to use for turning bats.

I coach high school baseball, teach in the wood shop, and think bat-turning would be a fun and challenging project. Where can I buy blanks?

—Mike McKay, Francesville, Ind.

A I have bought ash bat blanks from Paxton Lumber Company. They are about 3" in diameter and about 39" long. The price is around $16. My brother turned a bat from the dimensions of a broken bat used by Dante Bichette. He took it to spring training and showed it to Dante, who used it in batting practice, signed it, then gave it back to my brother. What a souvenir! Call Paxton in Denver at 800/332-1331, or check their other stores across the U.S.

—Gary Kreutzer, Brighton, Colo.

A Try www.kencraftcompany.com. The KenCraft Company of Toledo, Ohio, has ash bat blanks for $10.95 plus shipping. Send an e-mail, and they'll ship the blanks via UPS.

—David Peebles, Lyons, Ohio

Got a question?

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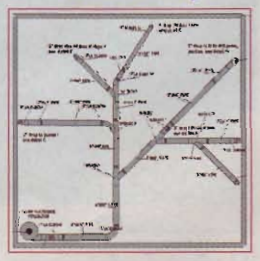

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router-bit storage

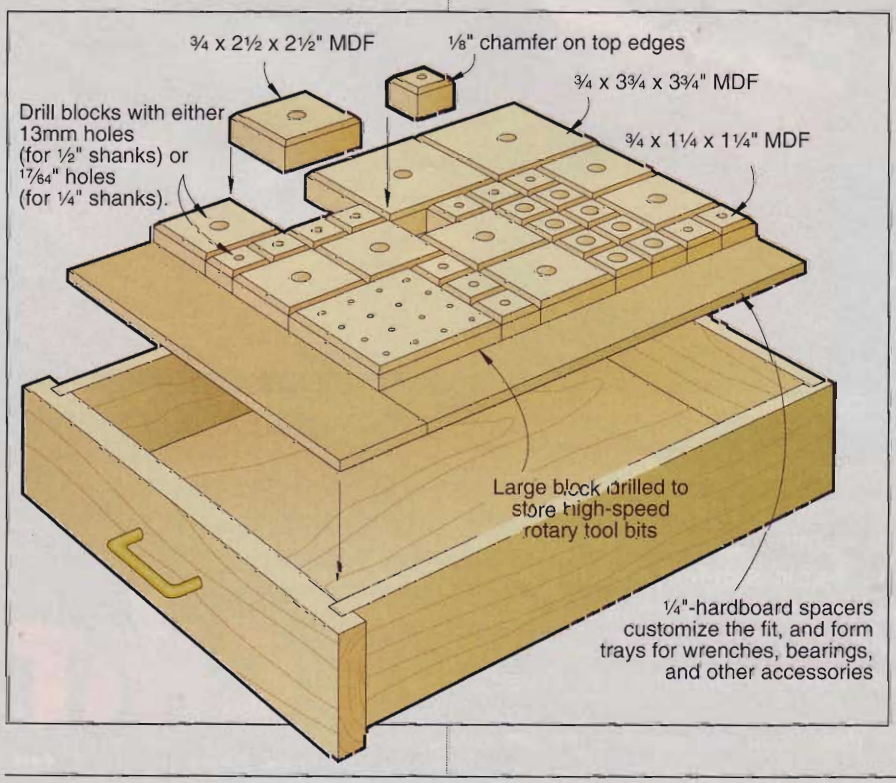
It's as easy as 1-2-3

Most router-bit storage systems force you to guess how many bits you'll add to your arsenal in the coming years. Dave Campbell, *WOOD®* magazine's Products Editor, neatly sidestepped that dilemma by designing this modular storage system that fits in any drawer and easily grows to meet your expanding bit collection. A 1-2-3 progression of block sizes maximizes the number of possible arrangements. Dave set aside one large square, and drilled it to hold rotary-tool bits.

To build your modular storage, rip ¾" MDF (medium-density fiberboard) into 1¼"-, 2½"-, and 3¾"-wide strips, then crosscut them into squares. Drill centered, slightly oversized holes for easy bit removal; 17/64" and 13mm holes for ¼"- and ½"-shank router bits, and 7/64" and 9/64" holes for 3/32"- and ⅛"-shank high-speed rotary tool bits.

***Note:** Finding a 33/64" bit to drill the oversized holes for ½" shanks is nearly impossible. Commonly used to install metric hardware, a 13mm bit is a readily-available substitute.*

To add versatility to this system, simply bore holes into the module(s) of your choice and glue in craft magnets. They hold small steel parts just great. Our thanks to Jeff Hilton of Mission Viejo, California, for sending in this tip.


¾ x 2½ x 2½" MDF
⅛" chamfer on top edges
¾ x 3¾ x 3¾" MDF
¾ x 1¼ x 1¼" MDF
Drill blocks with either 13mm holes (for ½" shanks) or 17/64" holes (for ¼" shanks).
Large block drilled to store high-speed rotary tool bits
¼"-hardboard spacers customize the fit, and form trays for wrenches, bearings, and other accessories

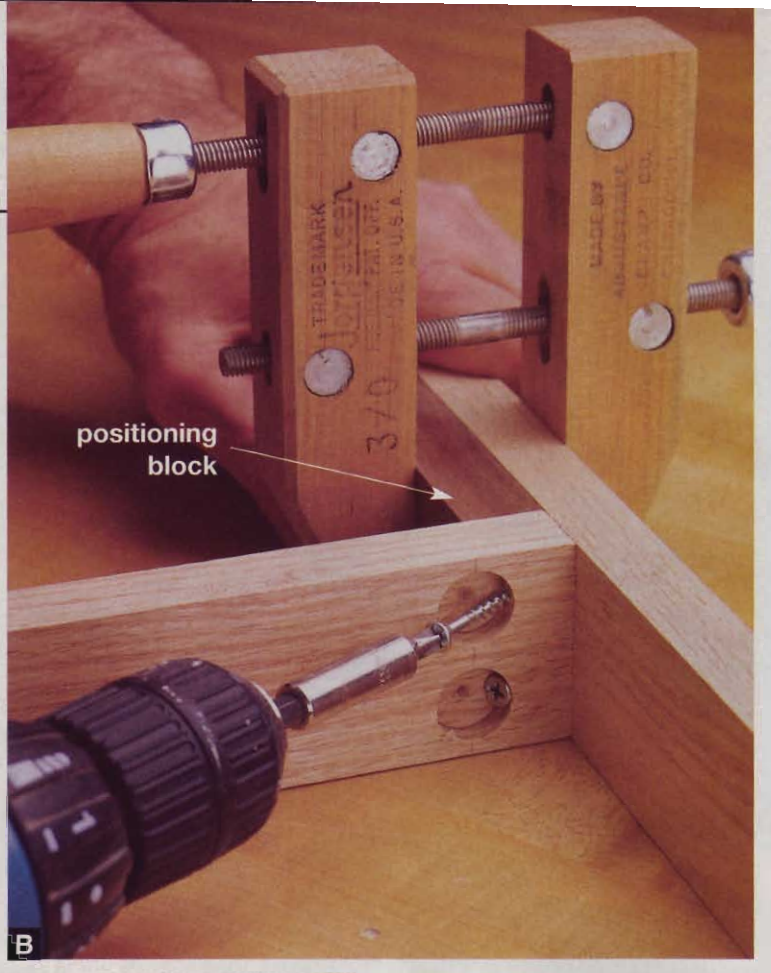
Slightly countersink the holes' edges. Chamfer the blocks' top edges on your table-mounted router. Hold the parts with a padded jointer pushblock to keep your fingers safely away from the router bit.

Pour some Danish oil-type finish into a small container, and dip the blocks. After wiping off the excess finish with a rag, dry the blocks on a window screen propped on sawhorses.

With the finish dry, arrange the blocks in your drawer. Fill in the extra space in the drawer with snug-fitting pieces of ¼" hardboard. You can use these tray-like spaces for storing accessories.

Written by **Robert J. Settich**
Project Design: **Dave Campbell**
Illustration: **Roxanne LeMoine; Lorna Johnson**
Photographs: **Douglas E. Smith**

low-tech pocket-hole joinery



A clamped positioning block keeps the workpieces from moving as you drive in the screws.

Okay, I'll admit it. My shop here at WOOD® *magazine has nearly every type of tool, jig, and accessory ever invented. So drilling pocket holes in the bottom shelf frames of the display stand on* page *56 didn't present a problem.*

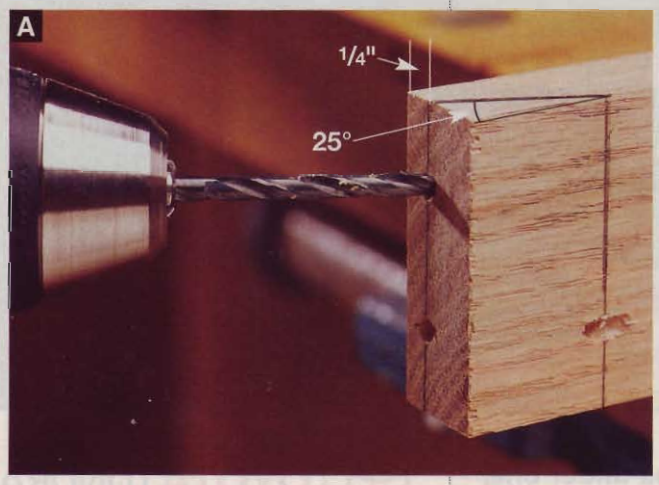
Now, that's easy for me to say, but I know that you may not own a pocket-hole jig. And usually, that's not a problem—you just substitute another form of joinery, say biscuits or dowels, in place of the pocket screws. But sometimes, as with the display stand, only a pocket-hole joint will do. Then, do as I did in my pre-pocket-hole-jig days. Simply drill a series of holes—without assistance from a jig—that form a pocket hole. This doesn't go fast, but it sure gets you by.

—Chuck Hedlund,
WOOD *Shop Manager*

First, drill the shank and screwhead holes

Select a twist bit—those with pilot points work best—that matches, or is just slightly larger than, the diameter of the screw you will be using. In this example, we used a #8×1½" screw requiring a 5/32" shank hole. Chuck the bit into a handheld drill.

On the end grain of the piece of wood that will be drilled for a pocket hole, mark the exit point of the screw. As shown in **Photo A**, we marked the exit point ¼" from the edge of a ¾"-thick workpiece. Then, mark a line on the edge of the piece that angles 25° from the exit point. This is the path of the screw. Start the drill bit at the exit point, angle it to follow the path line, and drill until the bit emerges from the face of the workpiece.



Follow your marked lines to drill the shank hole. Starting the hole in the end grain gives you better control.

Center a ¾" Forstner bit on the hole where the bit emerged from the workpiece face. Drill straight down to a depth of about ¼" to make room for the screwhead.

Assemble the joint

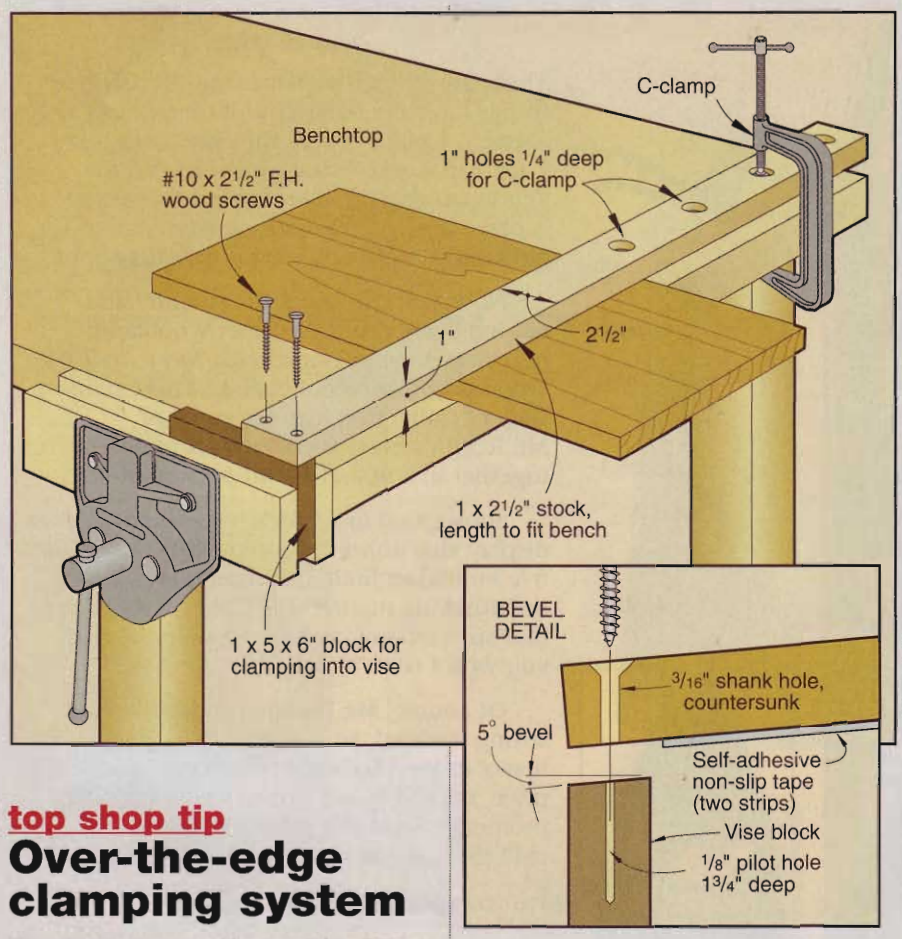
Align the two workpieces, then clamp a scrapwood positioning block, as shown in **Photo B**. This stops the pocket-hole workpiece from sliding during assembly.

If you have access to special pocket-hole screws, you can drive them right into most woods. But, if you're working with a dense wood, or using conventional screws, you'll need to drill pilot holes into the undrilled workpiece. To do this, simply align the workpieces with the positioning block clamped in place, then use the shank hole to guide the pilot-hole bit. Our #8 screw requires a 7/64" pilot hole in hardwood, a 3/32" pilot hole in softwood.

Photographs: **Baldwin Photography**

shop tips

Helping you work faster, smarter, and safer


C-clamp
Benchtop
1" holes 1/4" deep for C-clamp
#10 x 2 1/2" F.H. wood screws
1"
2 1/2"
1 x 2 1/2" stock, length to fit bench
1 x 5 x 6" block for clamping into vise
BEVEL DETAIL
3/16" shank hole, countersunk
5° bevel
Self-adhesive non-slip tape (two strips)
Vise block
1/8" pilot hole 1 3/4" deep

top shop tip

Over-the-edge clamping system

To cut out shapes with a portable jigsaw, I clamp my workpiece so that it extends over the end of the benchtop. That way, I don't cut into my bench accidentally. But I grew frustrated fumbling around with C-clamps every time I had to reposition my work. To make this task less aggravating, I devised the end-of-bench clamping jig shown *above*.

Here's how it works. After transferring the pattern to my workpiece, I clamp the jig's block in the vise at the end of my bench, positioned so that my workpiece just fits under the arm. Then I place a C-clamp in one of the holes on the arm, as shown, and tighten the C-clamp. The arm holds the workpiece securely.

This jig works better than ordinary C-clamps for a couple of reasons. First, the 5° bevel provides a little "spring" to the bar so that it holds better and releases quicker than a flat bar. Secondly, the non-slip tape (the same stuff you can buy for stair treads) prevents the workpiece from sliding while cutting.

Finally, the shallow holes keep the C-clamp from wandering, so I can apply and tighten the clamp with one hand, while I position the workpiece with the other. I made several holes to accommodate wider or narrower workpieces.

—Paul Engle, Manlius, N.Y.

Continued on page 26

top shop tip winner

Many of Paul Engle's furniture projects could rightly be called "Stickley pieces," even though they're not in the craftsman-style Gustav Stickley made famous. You see, our Top Shop Tip winner (*above*) lives practically in the shadow of the Stickley Furniture factory in Manlius, N.Y. And much of his project materials come from scrap and rejected wood from the plant.

Although he dabbled some before, he says he didn't get deep into woodworking until his retirement. But Paul has made up for lost time, helping to furnish his five children's homes, as well as the Manlius Methodist Church.

Paul Engle receives a Makita RD1101 2¼ hp router (left) for sending in this issue's Top Shop Tip. Thanks for your help, Paul!

How can you win a free tool, too

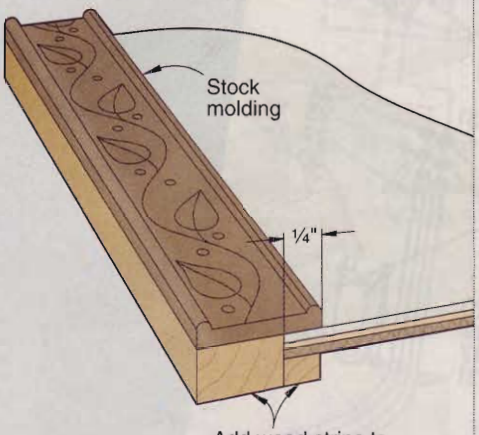
Tell us how you've solved a workshop puzzler, and we'll send you $75 if we print your solution. And, if we choose your tip as the Top Shop Tip of the issue, we'll also send you a tool prize worth at least $250.

Send your best tips, along with photos or illustrations and your daytime telephone number, to: **Shop Tips, WOOD Magazine, 1716 Locust St., GA-310, Des Moines, IA 50309-3023.** Or post your suggestions on our Top Shop Tip discussion group at **www.woodonline.com**.

Because we try to publish only original tips, please send your tips only to *WOOD*® magazine. Sorry, but we can't send back the things you send in.

Fancy frames from low-dough moldings

Using stock moldings to make picture frames is a good way to save time and money while still getting a good variety of styles. But the moldings, by themselves, are too thin to accept the rabbet for the glass, art, and backing material.



The drawing, *below left*, shows how I solved the problem.

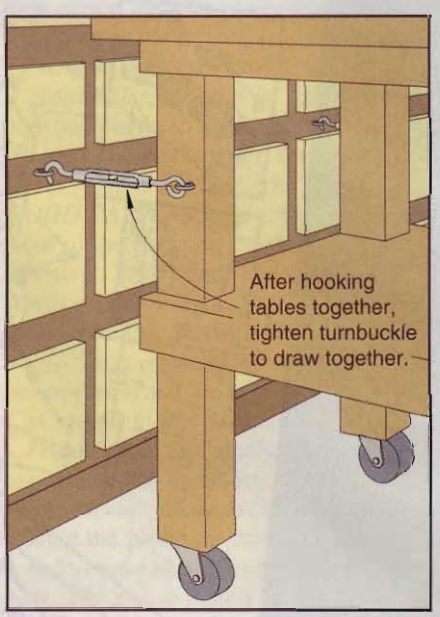
Before cutting the frame sides to length, I glue and tack a hardwood strip, ¼" narrower than the molding and at least ¼" thicker than the glass, mat, art, and backer, to the back of the molding. I then cut the frame pieces to size and assemble them as usual. A second ¼×¼" hardwood strip, screwed to the first, holds everything in place.

—Don McLellan, Marstons Mills, Mass.

Reining in a mobile table

To keep my roll-around assembly table from rolling away while I work, I attach it to my permanent bench with a pair of turnbuckles, as shown at *right*, on the two end legs. Because both benchtop and tabletop are at the same height, it creates one large, T-shaped work area. You could use the same method to attach an outfeed table to your tablesaw.

—T. B. Zalabak, Oklahoma City



Continued on page 28

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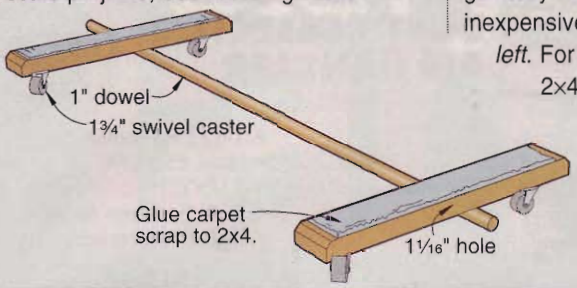
Need to keep projects moving? Call on dolly

I enjoy building cabinets and other large-scale projects, but wrestling them around the shop during construction and finishing was just plain hard work. And because my projects vary in size, a single dolly wouldn't do. The solution is the inexpensive adjustable dolly, shown at *left*. For my projects, 2' lengths of 2×4 and a 4' dowel work great, but you can scale this idea up or down to suit your specific needs.



—Andy Messner, Sagamore Hills, Ohio

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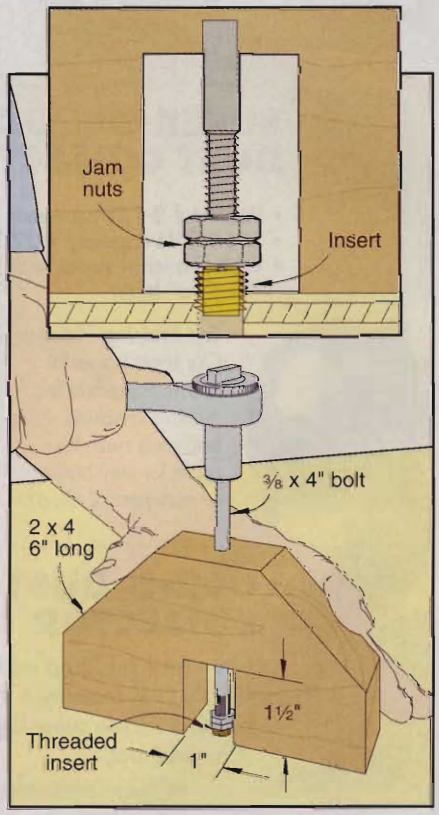
Make quick work of threaded inserts

A lot of woodworkers use a drill press to install threaded inserts, but large pieces can be too awkward or impossible for this practice. I've used the jig shown *below* to install over 150 threaded inserts in the music stands and other projects I build. I think it would be a great addition to your shop, and it takes only a few minutes to craft.

Start by cutting a 6" length of 2×4 to the shape shown in the drawing. For a ⅜" threaded insert, center a 13/32" hole over the opening in the bottom of the jig. Use your drill press to ensure the hole is exactly 90° to the bottom. Insert a ⅜×4" bolt through the hole, and double-nut the end to capture the bolt.



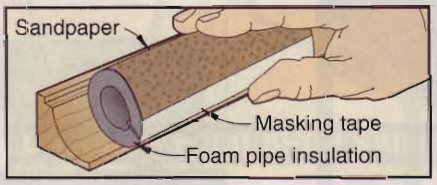
When you're ready to put in an insert, thread the insert onto the bolt, and position the jig over the hole. Using a socket wrench, apply downward pressure to the bolt while you turn the insert into your workpiece.

—C. Dean Becker, Waterloo, Iowa

Continued on page 30

Can somebody please get the foam?

For sanding irregular shapes, inside cuts, and rounded edges, you can't beat sandpaper wrapped around foam pipe insulation. Cut the insulation about 8" long, insert the edge of a piece of sandpaper into the slit in the insulation, and wrap it tightly. Secure the paper with masking tape.



The insulation provides backing for the sandpaper, but "gives" enough to follow the contour of the workpiece. If you need a bit more rigidity, insert a piece of dowel the same diameter as the inside of the insulation.

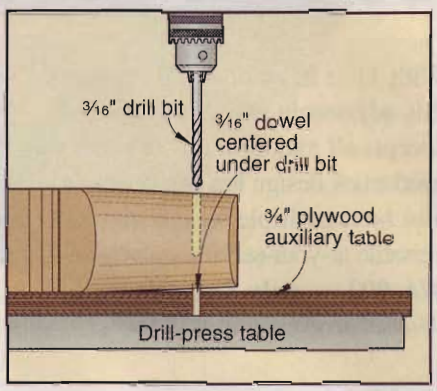
—Frank Ryan, Eugene, Ore.

Mating holes meet in the middle

For making wheeled toys, such as cars and trains, I needed a method to ensure that an axle hole drilled in one side of the toy's body came out in the same place on the other. Here's the solution I came up with.

For a 3/16" axle hole, I clamped a piece of 3/4" plywood to my drill-press table and drilled a 3/16" hole in it. I then inserted a short piece of dowel, leaving about 1/4" standing proud.

Next, I marked the axle-hole locations on both sides of my workpiece and drilled a shallow (maybe 1/8–1/4" or so deep) 3/16" hole at one of those marks. Slipping that shallow hole over the dowel, I then positioned my workpiece to drill the hole directly opposite, and bored more than halfway through. Flipping the workpiece over, with the shallow hole now on top and the half-through hole now over the dowel, I again bored just over halfway through.



Although you may need to change the length of the dowel, this technique works regardless of the shape of the object being drilled or the angle of the hole. As long as the dowel is directly under the drill bit, the holes can't help but line up.

—Stan Pulaski, Cedar Springs, Mich.

Continued on page 32

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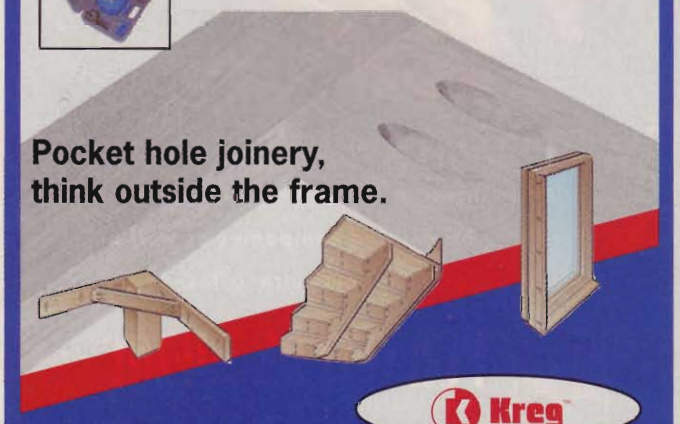

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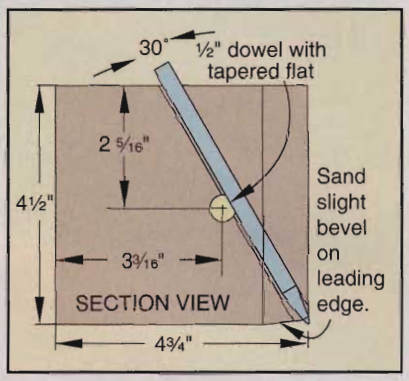
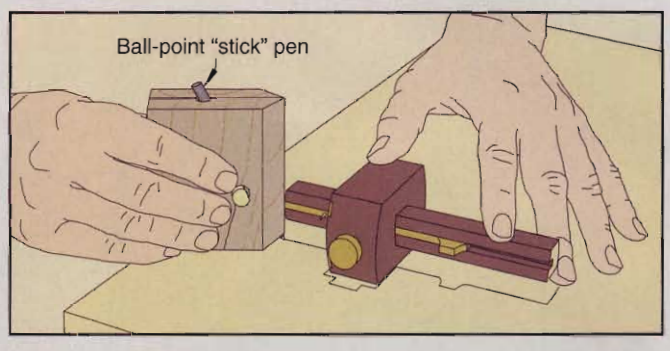
A tracing tool for hard-to-trace tools

Have you ever tried to accurately trace the shape of an object that doesn't lie flat, such as a marking gauge? It's hard to keep the pencil at the correct angle to account for the offset of the lead. But I made this tracing tool, shown *below*, that creates a perfect silhouette of nearly anything less than 4" tall.

I started by cutting a 45° bevel on the front edge of two matching pieces of hardwood.





Next, I routed matching grooves to accept a ball-point "stick" pen, starting from the bottom front corner of each piece, then glued the pieces together.

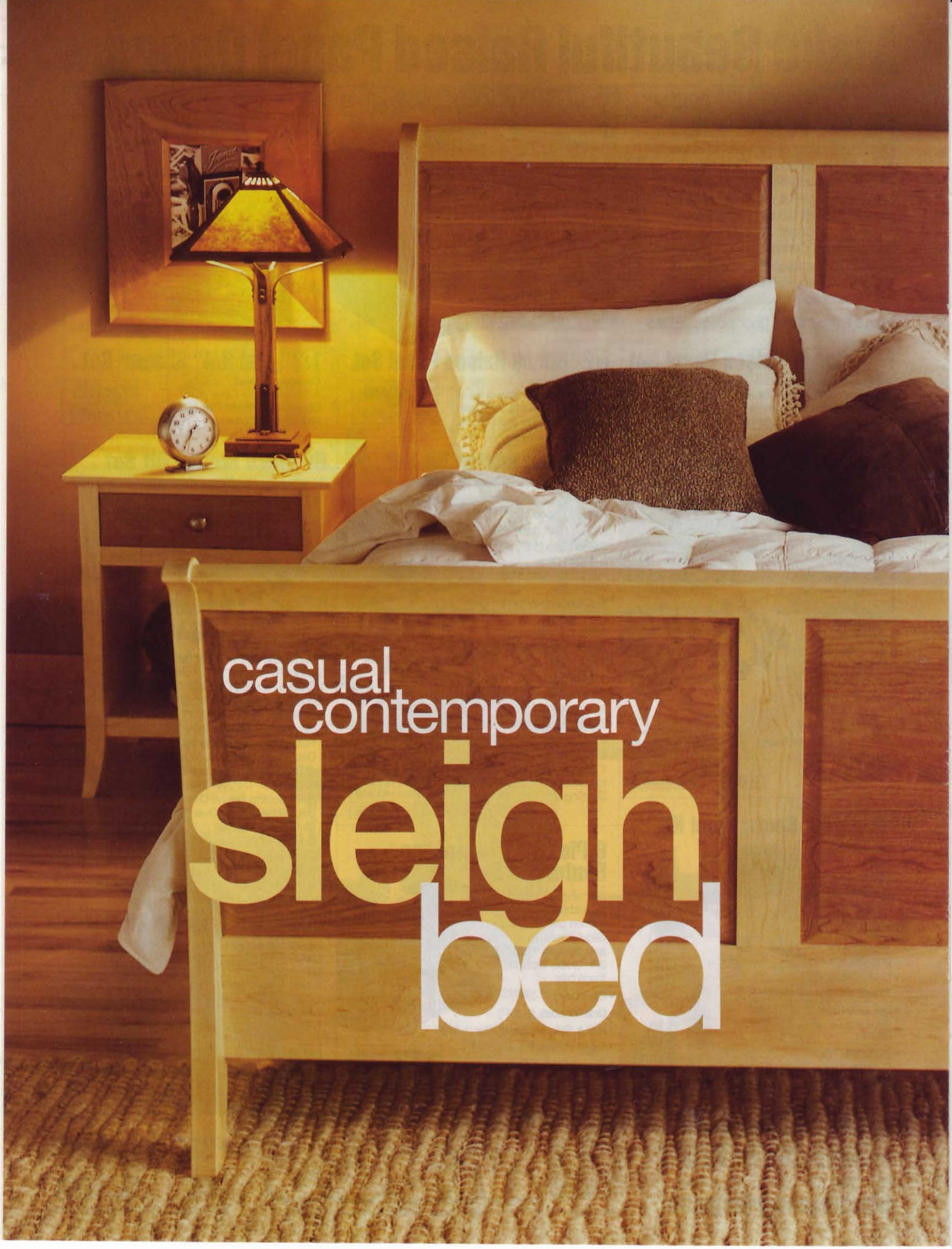
After the glue dried, I drilled a ½" hole where shown, and sanded a tapered flat along a 2" length of ½" dowel. Finally, I sanded a slight bevel on the bottom of the tool's point, as shown in the Section View drawing.

To use the tracing tool, insert a stick pen until the ball point is flush with the point of the tool. Press the tapered dowel into the ½" hole to hold the pen snugly in place. Now, trace around the object, as shown *above*, keeping the point of the tracing tool in contact with the object.

—Jay Wallace, Ashland, Ore.

A few more tips from our woodworking pros

- Want to know how you can precisely place a biscuit slot in the middle of a free-form surface? See how on *page 40* of the sleigh-bed project.
- If standing a panel on edge to bevel it on the tablesaw gives you the willies, learn a safe (and accurate) method to do it on *page 46*.
- Learn how to machine acrylic panels to exact size with smooth edges. See the display stand on *page 58*.


casual
contemporary
sleigh
bed

Build the bed first, then add any or all four other pieces in our matching bedroom set.

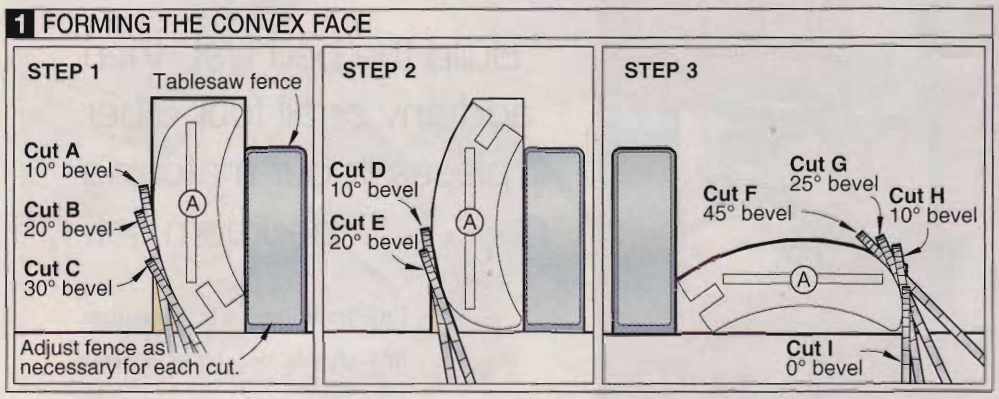
A little traditional, a little modern, this stylish bed lends a fresh look to most interiors. Its design features the graceful curves of a classic sleigh bed, while incorporating straightforward construction. The timeless appearance of the cherry raised panels nicely complements the bright and clean lines of the solid-maple frame.

Note: *As you can see in the Bill of Materials, this project requires some stock thicker than ¾". You can buy thick stock if it's available in your area, or laminate thinner material to meet your needs—typically a more economical alternative. In either case, you'll need a planer to bring the stock to final thickness. To order the leg patterns, see* page 37.

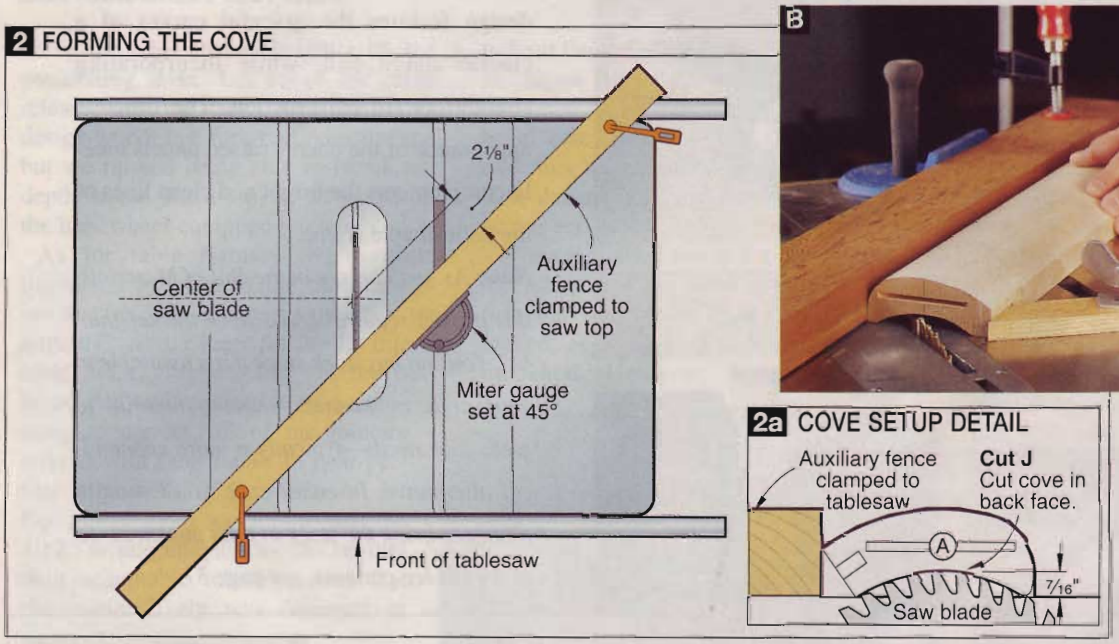
Stay tuned for plans on building the whole set

Feeling ambitious? Then you'll be pleased to know that, starting with the next issue, we'll show you how to build the matching bedroom furniture featured here.

The schedule: October 2001, nightstand *(shown flanking the bed)*; November 2001, an armoire *(above)* that we'll show you how to modify easily into an entertainment center; and December 2001, dresser and matching mirror *(left)*.



Clamp the rails to your bench, and keep the random-orbit sander in constant side-to-side motion to remove facets.



Use a feather board and a slow, but steady, feed rate to cut a consistent cove with minimal sawtooth marks.

For smooth sledding, shape the upper rails first

1 Cut two upper rails (A) to 1½×3⅞×61¼" and a 1½×3⅞×24" test blank from scrap stock. These blanks must be flat. Make all of the cuts described in the following steps in the test blank before cutting the rail blanks.

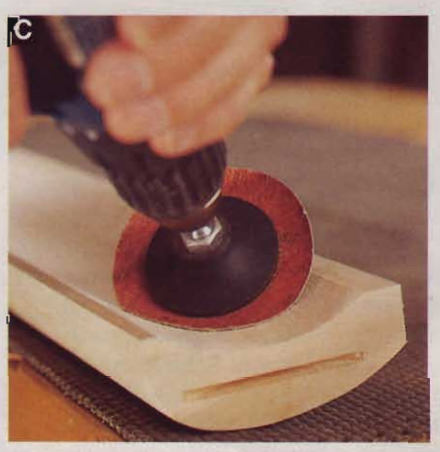
2 Copy three sets of the mirrored **Full-Size Upper-Rail End Patterns** on the *WOOD PATTERNS®* insert. With spray adhesive mount an "End 1" pattern to one end of each blank and an "End 2" pattern to the opposite end. Be sure to position the patterns so that their shapes and cuts align from end to end when you machine the rails. Cut slots for #20 biscuits in the ends, where marked on the patterns.

3 Tilt your tablesaw blade to 10°. Sight down the fence length, and adjust the fence to make cut A in **Drawing 1, Step 1.** The blade should cut right up to, but not into, the pattern line. Remember, practice all of your cuts in the test blank first. Make cuts B and C, moving the fence and blade angle with each cut.

Note: *The drawings show setups for a left-tilting blade. For a right-tilting blade, move your fence to the blade's left side. Your setups are then mirror images of the ones shown.*

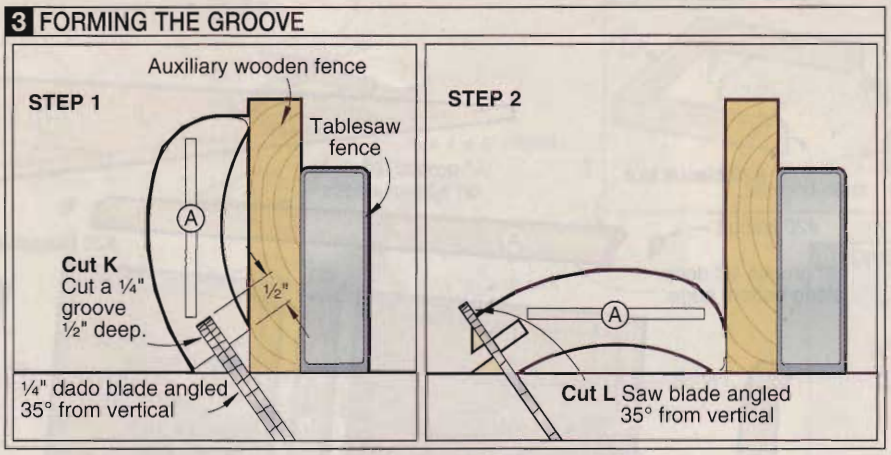
4 Flip the rail blanks end for end, and make cuts D and E, as shown in **Step 2,** adjusting the fence and saw blade with each cut. Again, flip the rail blanks end for end to make cuts F, G, H, and I, as shown in **Step 3,** adjusting the fence and blade with each cut.

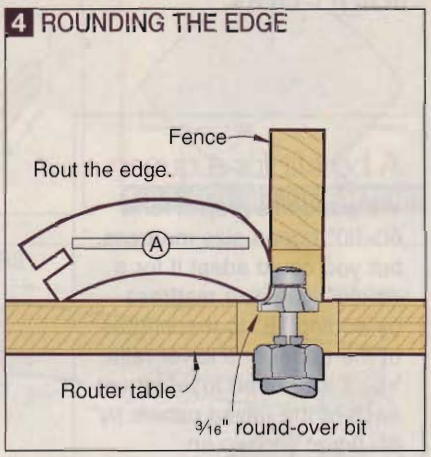
5 Smooth the rail facets by moving a random-orbit sander with 80-grit abrasive side to side and along the length of the rails, as shown in **Photo A.**



Keep the drill-powered, flexible-disc sander moving, and use light pressure to prevent gouging the cove.

6 Set up your tablesaw to cut a cove into the opposite face of the rail blanks. See **Drawings 2** and **2a** and **Photo B.**





Position the auxiliary fence with the blade raised to 7/16", then lower the blade so it cuts 1/8" deep and make a cut in your test blank. Make three more cutting passes, raising the blade 1/8" for the second and third cuts and 1/16" for the final cut. Adjust the fence as necessary so the cove cut falls where marked on the pattern, then cut your rails.

7 Remove the sawtooth marks in the cove with an 80-grit flexible sanding disc in a handheld drill, as shown in **Photo C**. If you don't have this drill accessory, make a hand-sanding block by bandsawing and sanding a 6"-long scrap of 2×4 to fit the cove's profile.

8 Install a ¼" dado blade in your saw, and tilt it to 35°. Cut a groove the length of the rails, where shown in **Drawing 3, Step 1**. Replace the dado blade with a ripping blade set at a 35° bevel. Rip as shown in **Step 2**.

9 Round the rail edge, as shown in **Drawing 4**. Hand-sand the rails with 100- and 150-grit abrasive.

Next up, the lower rails and mullions

1 Cut the lower rails (B) and mullions (C) to size. Install a ¼" dado blade in your tablesaw, tilt it 10°, and adjust it to ½" high. Cut a groove along one edge of two of the lower rails—see **Drawings 5** and **5c**. Do not groove the headboard's bottom rail. Cut biscuit slots in the rail ends, where shown on **Drawing 5c**.

2 Readjust the dado blade for a 0° bevel. Cut a centered ¼" groove ½" deep on the edges and ends of the mullions (C). Bevel the bottom end of both mullions at a 10° angle, as shown on **Drawing 5b**.

3 From scrap, cut two ¼×15/16×2½" loose tenons and two ¼×7/8×2½" loose tenons. Glue a tenon, centered, into the grooves on the ends of both mullions (C), as shown on **Drawing 5**. The narrower tenons go into the bottom ends of the mullions. Remove excess glue.

Make the shapely sleigh-bed legs

1 Adhere the full-size headboard leg pattern to a piece of ¼×8¼×52½" hardboard. Use the long straight edges of the hardboard to align the pattern halves. Do the same with the full-size footboard leg pattern and a piece of ¼×7½×35½" hardboard. Cut and sand the hardboard to the pattern lines. Leave the patterns in place.

Note: *Due to their large size, the full-size leg patterns will not fit onto the WOOD PATTERNS® insert in the center of the magazine. Because the exact placement of the biscuit slots and panel grooves doesn't allow us to show a reduced gridded pattern, we have arranged, at our expense, to have full-size leg and upper-rail end patterns printed. We will send them to you at a minimal fee to cover postage, envelope, and handling. For your patterns, send $5 along with your name and address to: Sleigh-Bed Leg Patterns, WOOD® magazine, 1716 Locust Street, GA-310, Des Moines, IA 50309-3023.*

2 Cut blanks for the headboard legs (D) and footboard legs (E) to the sizes listed. Trace the outline of the headboard and footboard legs onto the blanks using the templates. Bandsaw the legs to shape, staying just outside the traced lines. Joint a straight edge onto each leg where it meets a rail, and sand to shape the other leg edges.

3 Adhere each template to a leg with a couple of small strips of double-faced tape. Using a drill press, drill alignment holes through the template and into the legs, where indicated on the patterns, and as shown in **Photo D**.

Because the legs on opposite sides of the bed mirror each other, you need to

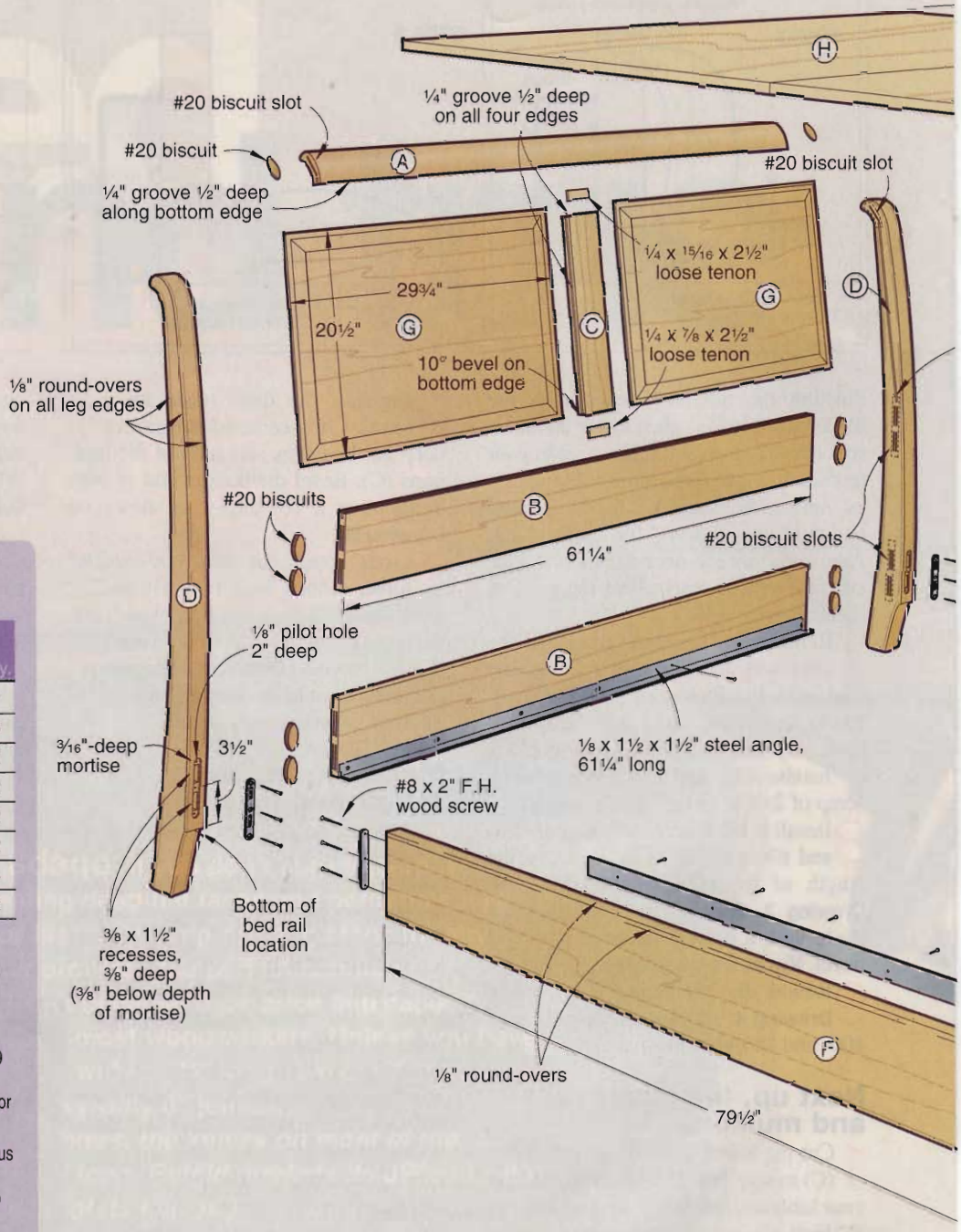
With the template mounted on it, drill 1/16" alignment holes about 1/8" into the leg.

shop tip

How to select double-faced tape. Whenever you use double-faced tape to temporarily adhere a template to a workpiece, or two workpieces together, use the cloth-backed type. It holds much more firmly than the thinner plastic-film tape, especially if your pieces have any fine dust on them.

A bed fit for a queen

We sized this project for a 60×80" queen-size mattress, but you could adapt it for a 76×80" king-size mattress by adding 16" to the lengths of the upper and lower rails. You'll also need to lengthen each of the raised panels by 8". If you choose an 84"-long king-size mattress, then add an extra 4" to the lengths of the bed rails.



bill of materials

sleigh bed

Part	FINISHED SIZE T	W	L	Matl.	Qty.
A upper rails	1½"	3⅞"	61¼"	M	2
B lower rails	1"	7"	61¼"	M	3
C mullions	1"	3½"	19¾"	M	2
D headboard legs	1½"	6¾"	52½"	M	2
E footboard legs	1½"	6"	35½"	M	2
F bed rails	1½"	7"	79½"	M	2
G raised panels	¾"	20½"	29¾"	C	4
H mattress supports	¾"	40¼"	61⅜"	P	2

Materials key: M–maple, C–cherry, P–plywood.

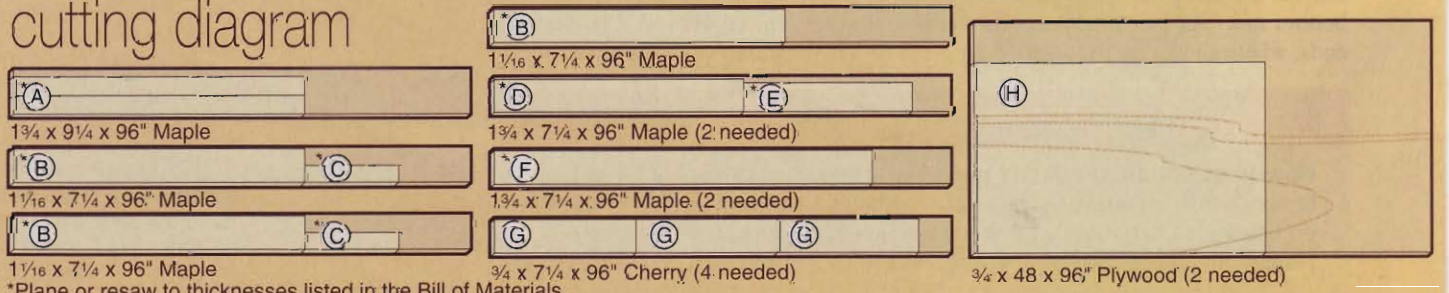
Supplies: ⅛x1½x1½" steel angle, 72" long (4); #8x¾" panhead screws (30); #8x2" flathead wood screws (24); #20 biscuits (28).

Buying guide

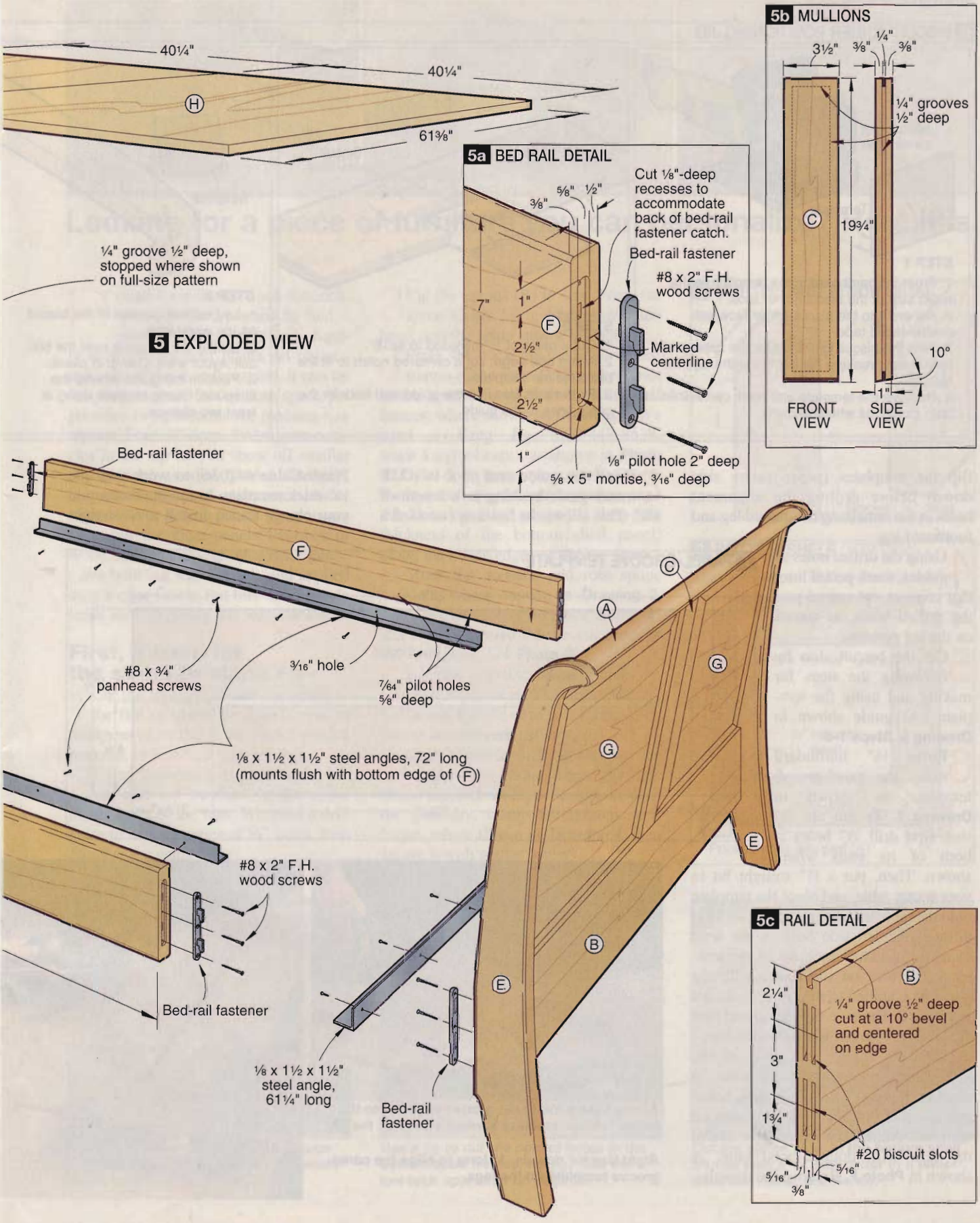
Bed-rail fasteners: Set of four, item 127456, $9.99 plus shipping. From Woodcraft, P.O. Box 1686, Parkersburg, WV 26102-1686. Call 800/225-1153, or go to www.woodcraft.com.

Vertical raised-panel bit: Item 690-602, $59.90 plus shipping. From Jesada Tools, 310 Mears Blvd., Oldsmar, FL 34677-3047. Call 800/531-5559, or go to www.jesada.com.

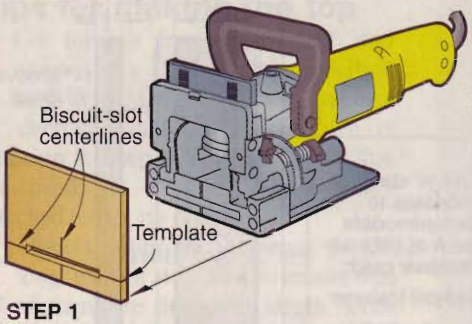
cutting diagram



*Plane or resaw to thicknesses listed in the Bill of Materials.

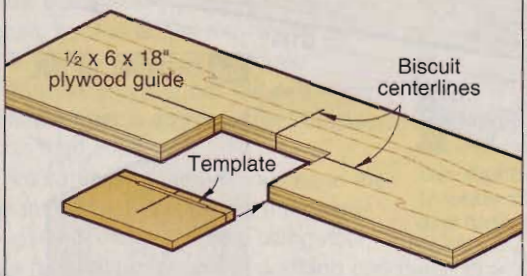

40¼"
40¼"
H
61⅜"
¼" groove ½" deep, stopped where shown on full-size pattern
5 EXPLODED VIEW
5a BED RAIL DETAIL
Cut ⅛"-deep recesses to accommodate back of bed-rail fastener catch.
⅜"
⅝"
½"
7"
1"
F
2½"
2½"
1"
Bed-rail fastener
#8 x 2" F.H. wood screws
Marked centerline
⅛" pilot hole 2" deep
⅝ x 5" mortise, 3/16" deep
5b MULLIONS
3½"
⅜"
¼"
⅜"
¼" grooves ½" deep
C
19¾"
10°
1"
FRONT VIEW
SIDE VIEW
Bed-rail fastener
F
#8 x ¾" panhead screws
3/16" hole
7/64" pilot holes ⅝" deep
⅛ x 1½ x 1½" steel angles, 72" long (mounts flush with bottom edge of F)
#8 x 2" F.H. wood screws
Bed-rail fastener
C
A
G
G
E
B
E
⅛ x 1½ x 1½" steel angle, 61¼" long
Bed-rail fastener
5c RAIL DETAIL
B
2¼"
¼" groove ½" deep cut at a 10° bevel and centered on edge
3"
1¾"
#20 biscuit slots
5/16"
5/16"
⅜"

6 BISCUIT-JOINER POSITIONING JIG



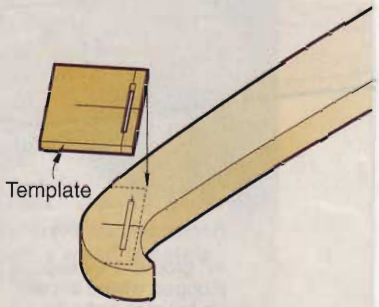
STEP 1

1. From ¼" hardboard, cut a template to the exact size of the biscuit-joiner face.
2. Adhere it to the biscuit-joiner face with double-faced tape.
3. With the biscuit joiner set for the appropriate biscuit size, make a full-depth cut through the tempate.
4. Remove the template and mark centerlines in both directions where shown.



STEP 2

1. Cut a piece of ½" plywood to 6x18".
2. Along one edge, cut a centered notch to fit the biscuit-joiner template.
3. Fit the template into the guide and transfer the centerlines to the guide.



STEP 3

1. Lay out the location of the biscuit on the workpiece.
2. Locate the template over the biscuit layout lines. Clamp in place.
3. Position the guide around the template. Clamp in place using at least two clamps.

flip the templates (paper-pattern side down) before drilling the alignment holes in the remaining headboard leg and footboard leg.

4 Using the drilled holes as guides, mark pencil lines that connect and extend past the drilled holes, as shown on the leg patterns.

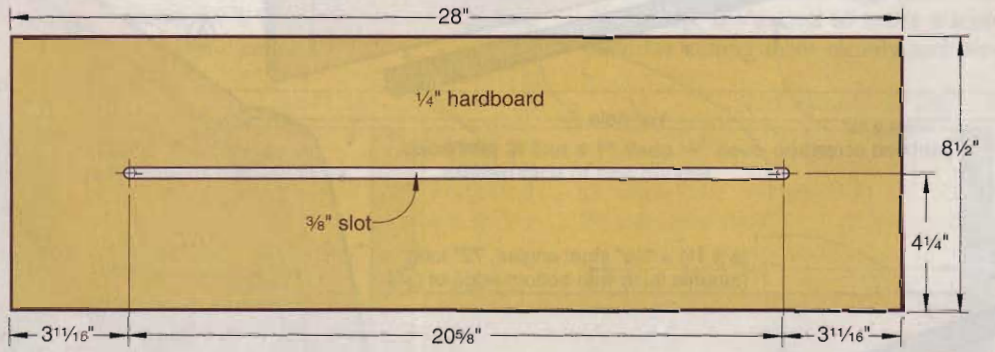
5 Cut the biscuit slots by following the steps for making and using the template and guide shown in **Drawing 6, Steps 1–5.**

6 From ¼" hardboard make the panel-groove template as shown in **Drawing 7.** To cut the ⅜" slot, first drill ⅜" holes at both of its ends where shown. Then, put a ⅜" straight bit in your router table, and place the template onto the table with the router bit sticking through the left-side hole in the template. Adjust the fence up to the template and turn on the router with the template clamped to the table, as shown in **Photo E.** Remove the clamp and rout the slot, stopping at the right-side hole.

7 Drill ⅜" holes ½" deep at the stopped-groove alignment holes in the legs. Place ⅜" dowels in these holes, and use them to align the panel-groove template. Adhere the template to one of the legs with double-faced tape, as shown in **Photo F.** Remove the dowels.

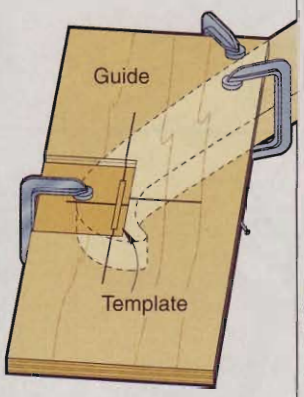
8 Grind the guide end of a ⅜"-O.D. router guide bushing to a length of 3/16". This allows the bushing (we used a Porter-Cable #42036) to work with the ¼"-thick template. Install the bushing in your plunge router. Install a ¼" straight

7 PANEL-GROOVE TEMPLATE

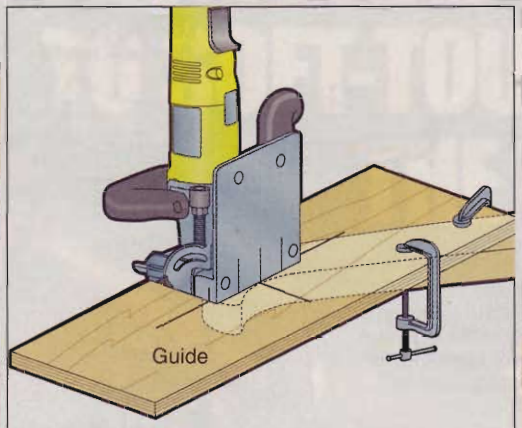


Above **Clamp the panel-groove template to the router table to stabilize it when you raise the bit.**

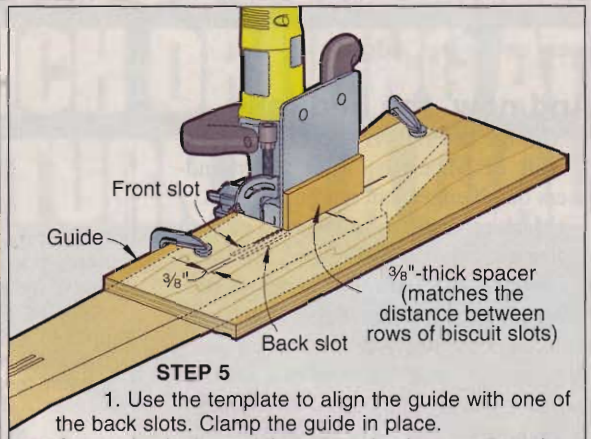
Right **Use ⅜" dowels, 1" long to align the panel-groove template on the legs.**



4. Remove the clamp from the template, then remove the template.



STEP 4
1. Place the biscuit joiner in the guide as shown.
2. Cut the biscuit slot.
3. Remove guide.



STEP 5
1. Use the template to align the guide with one of the back slots. Clamp the guide in place.
2. Cut the back slot, put the spacer in place, and cut the front slot. Unclamp the guide.
3. Use the template to align the guide with the back slot that's to the right or left of the previously cut slots. Clamp the guide into position and repeat Step 2.

or downcut spiral bit, and rout the ½"-deep groove into the leg in three passes. Repeat for the other three legs.

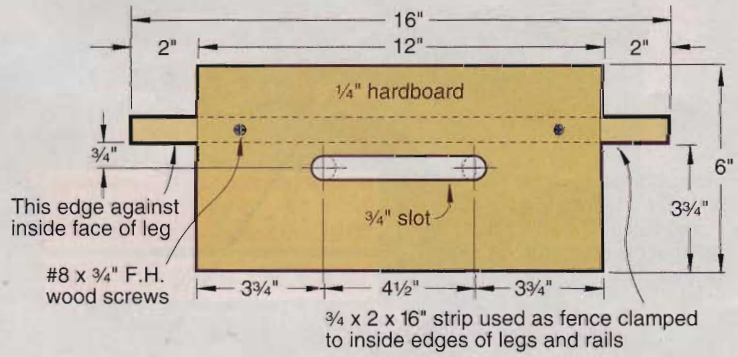
9 Make the bed-rail fastener mortise template shown in **Drawing 8**. Rout its ¾" slot in the same way you routed the ⅜" slot in the panel-groove template. Use the full-size leg patterns to transfer the rail centerlines to the inside edges of the four legs. Clamp the template onto the inside edge of a leg with its centerline aligned with the rail centerline marked on the leg, as shown in **Photo G**. Using the same bit and guide bushing as before, adjust the bit to cut a 3/16"-deep mortise for the bed-rail fastener.

10 Remove the template, place the bed-rail fastener socket in its mortise, and mark the locations of the screw holes and the hook recesses. Drill ⅛" pilot holes 2" deep, where marked, and drill and chisel the recesses ⅜" deeper than the bottom of the mortise. Repeat these steps on the other legs. Install the

shop tip

Choose the right bit for reducing tearout. You'll dramatically decrease grain tearout along the edge of a groove like the ones cut in the legs for the panels if you use a downcut spiral bit like the one at *right*. That's because its spiral flutes shear wood fibers with a downward motion—opposite of how a drill bit pulls fibers up and out of a hole. If you must use a straight router bit for these cuts, you can lessen your tearout by taking multiple light cuts.

8 BED-RAIL FASTENER MORTISE TEMPLATE



Position the fence of the bed-rail fastener mortise template on the inside edge of the leg, and align the centerlines.

socket halves of the bed-rail fasteners with #8×2" screws. Rout ⅛" roundovers on the legs' edges.

And now, the bed rails

1 Cut the bed rails (F) according to the Bill of Materials. Rout ⅛" roundovers on all edges, but not on the ends.

2 Mark centerlines on the ends of both rails, as shown in **Drawing 5a**. Place the fence of the bed-rail fastener mortise template on the inside edge of the rail, align its centerline with the centerline of the rail end, and rout bed-rail fastener mortises just as you routed the mortises in the legs.

3 Chisel recesses ⅛" deeper than the mortises to accommodate the backs of the hook plates. Mark and drill ⅛" pilot holes, and attach the plates with #8×2" screws.

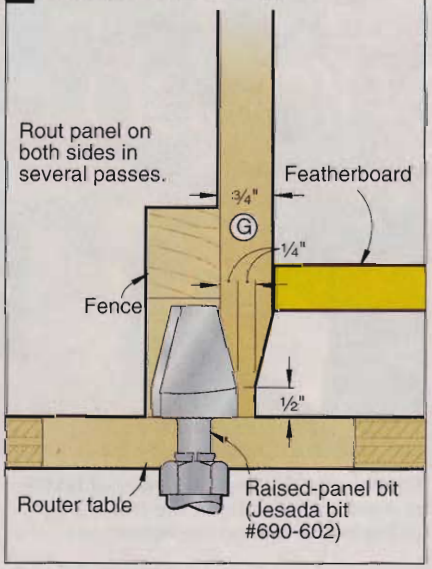
Let's glue up and rout the cherry panels

1 Edge-glue cherry boards to make up the four flat raised panels (G) specified in the Bill of Materials.

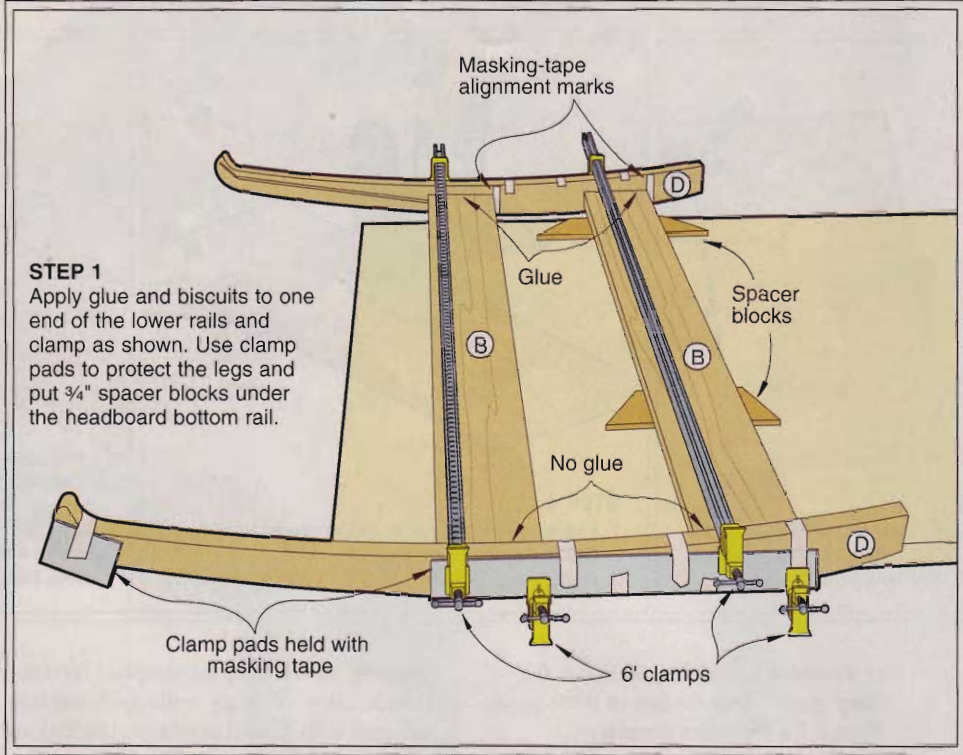
Note: *Make the following cut in ¾" scrap stock, and test the fit of its tongue in the ¼" rail grooves, before routing your panels.*

2 With a 3-hp, variable-speed table-mounted router, raise both sides of the panels, as shown in **Drawing 9** and **Photo H**. Rout the ends first, then the edges. Make the cut in several passes to avoid grain tearout.

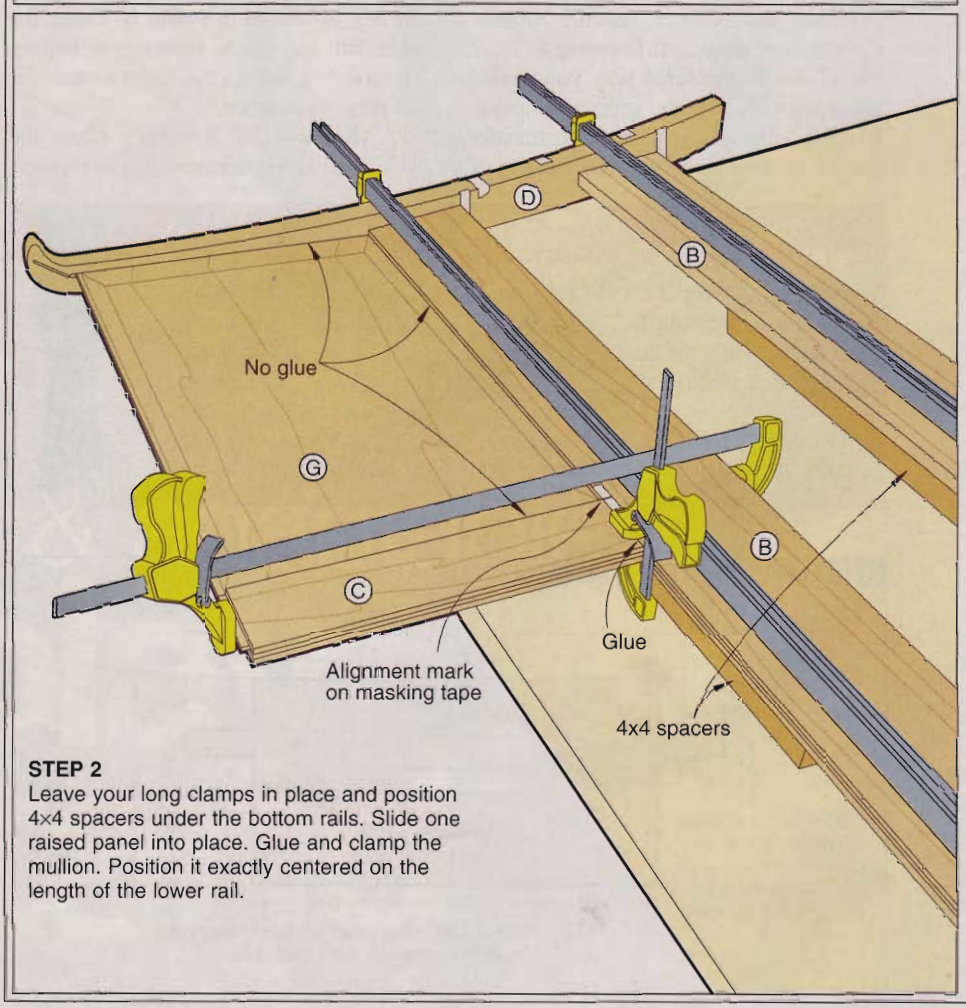
9 RAISED PANEL SETUP



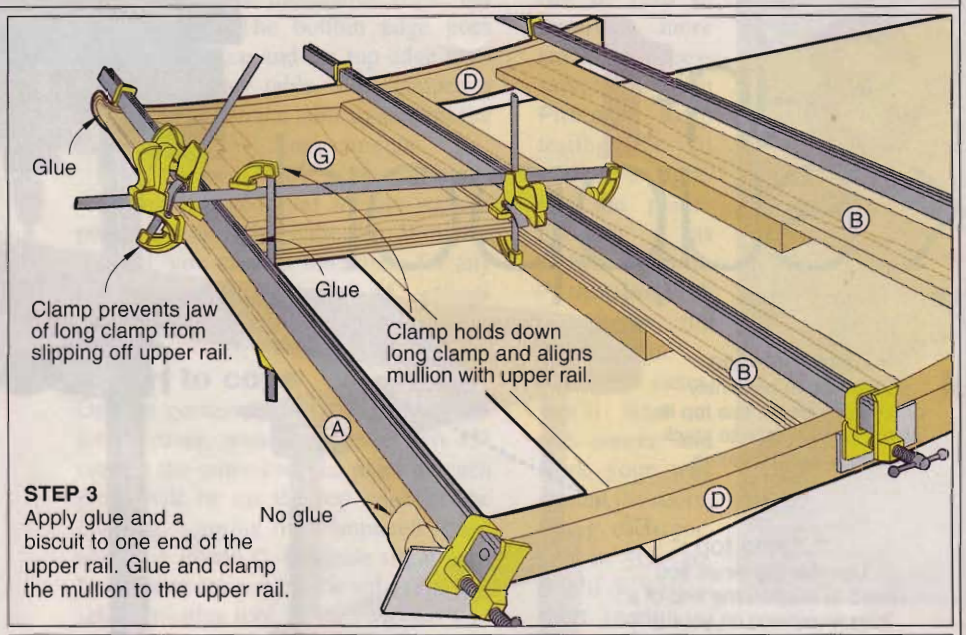
10 ASSEMBLING THE HEADBOARD AND FOOTBOARD



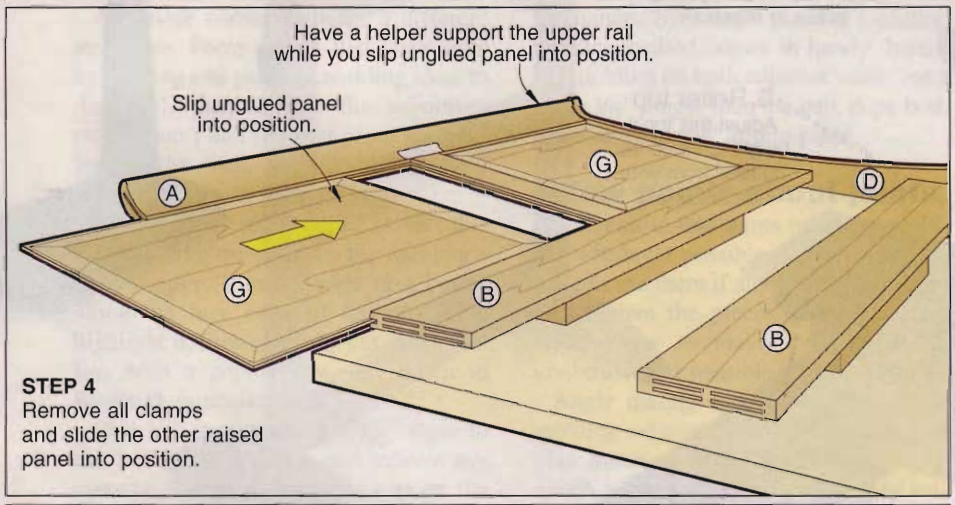
STEP 1
Apply glue and biscuits to one end of the lower rails and clamp as shown. Use clamp pads to protect the legs and put ¾" spacer blocks under the headboard bottom rail.



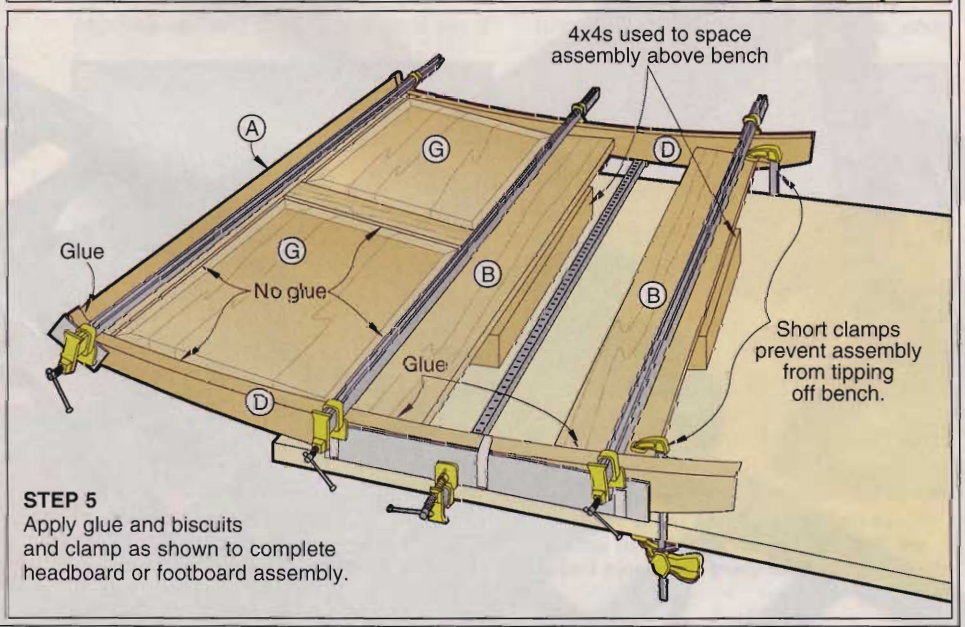
STEP 2
Leave your long clamps in place and position 4×4 spacers under the bottom rails. Slide one raised panel into place. Glue and clamp the mullion. Position it exactly centered on the length of the lower rail.



STEP 3
Apply glue and a biscuit to one end of the upper rail. Glue and clamp the mullion to the upper rail.



STEP 4
Remove all clamps and slide the other raised panel into position.



STEP 5
Apply glue and biscuits and clamp as shown to complete headboard or footboard assembly.

Mount featherboards on a wood bar to bear on the panel above the bit.

Time for this sleigh to cross the finish line

Note: *You'll need four 6'-long clamps, one 3' clamp, and a helper to assemble the headboard and footboard.*

1 Apply one coat of clear finish to the raised panels, then glue and clamp together the headboard and footboard following the steps in **Drawing 10, Steps 1–5**. Use masking tape to align the rails and mullions during clamp-up, and tape ¼" clamp pads in place to prevent marring. It's a good idea to first do a dry assembly to make sure that everything fits.

2 After removing the clamps, apply one more coat of clear finish to the raised panels, and two coats to all other surfaces, sanding between coats.

3 Cut the ⅛×1½×1½" steel angles to the lengths shown in **Drawing 5**. Drill 3/16" holes about every 10" into the angles. Clamp the angles flush with the bottoms of the rails, with the 72" angles centered lengthwise. Drill 7/64" pilot holes ⅝" deep, through each of the holes in the angles. Secure the angles with #8×¾" panhead screws.

4 Connect the rails to the headboard and footboard. Cut the mattress supports (H) from ¾" plywood. Add a queen-size mattress. (We recommend the thick ones that don't require box springs.) Sweet dreams!

Written by **Bill Krier** with **Charles I. Hedlund**
Project Design: **James R. Downing**
Illustrations: **Kim Downing; Roxanne LeMoine**
Photographs: **Baldwin Photography; Andy Lyons**

3-in-1 work support

1. Platform top
Great as an assembly or finishing stand, this top is also a handy place to stack parts while machining.

2. Glide top
Use this top when you need to support the end of a long workpiece on your drill press or mitersaw.

3. Roller top
Adjust this top's height to catch the outfeed from your tablesaw or planer.

Whether you're machining long stock or simply looking for a place to rest your workpiece, you'll find this versatile stand ready to help. With adjustable height and interchangeable glide, roller, and platform tops, it's a perfect match for any number of tasks.

First, build a sturdy base

1 Cut four ¾×2¼×29" pieces of stock, and glue and clamp them together in pairs to form two 1½"-thick blanks for the uprights (A). Joint and trim them to the size listed in the Bill of Materials. Install a dado blade in your tablesaw, and plow grooves in the uprights, where shown in **Drawing 1, Step 1**. Cut the fillers (B) to size, and glue and clamp them in place, where shown. The fillers' and the uprights' bottom ends are flush.

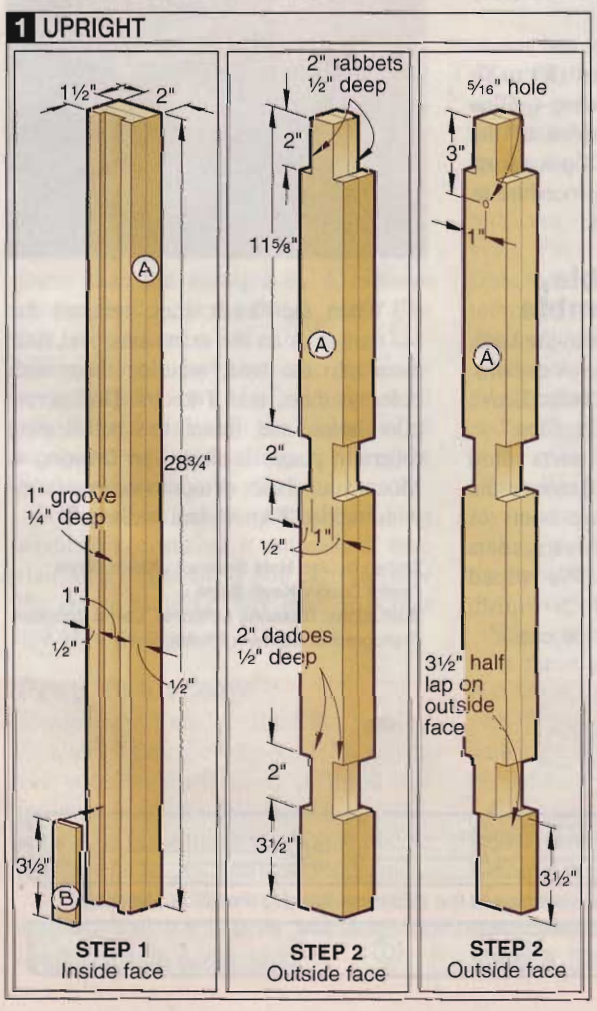
2 With the dado blade in your tablesaw, form the dadoes and rabbets in the uprights' edges, where shown in **Step 2**. Now form the half laps and drill the hole, where shown in **Step 3**.

3 Cut four ¾×4¼×16¼" pieces of stock, and glue and clamp them together in pairs to form two 1½"-thick blanks for the feet (C). Joint and trim them to size. Make four copies of the Foot from the *WOOD PATTERNS®* insert, and cut them out along the lines. Tape the half-patterns together to form the whole foot. (Half of each pattern will be face down.) Adhere the patterns to the foot blanks with spray adhesive.

4 Form half laps, where indicated on the pattern, to mate with the laps at the bottoms of the uprights. Now bandsaw and sand the feet to the pattern lines. Remove the patterns. Glue and clamp the feet to the uprights. When the glue dries, sand the joints smooth. Set the leg assemblies (A,B,C) aside.

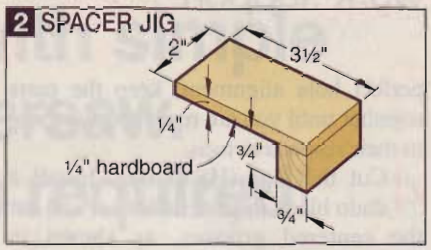
5 Plane two ¾×4½×96" boards to ½" thick. From one, cut the six rails (D) to size. Set the other board aside for the top supports (G). From 1"-thick stock, cut the spacers (E) to size. Make the spacer jig, shown in **Drawing 2**. Glue and clamp spacers to each end of three rails, as shown in **Photo A**. Then glue and clamp a third spacer at the rails' centers, where shown on **Drawing 4**.

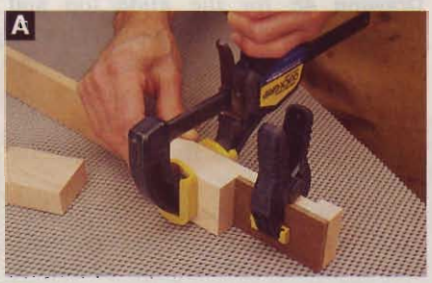
6 Stand the two legs upright on your workbench. Spread glue in the lower dadoes in one edge of each upright, and slip in one rail/spacers assembly. Spread glue in the dadoes in the uprights' other edges and on the spacers, and clamp a second rail in place, as shown on **Drawing 4**. Repeat this process for the other two rail/spacer/rail assemblies. Make sure the rails' ends are flush with the uprights' outside faces and that the whole assembly is square.



Now add extensions and interchangeable tops

1 From 1" stock, cut the extensions (F) to size. Mark a stop line for the groove's end on one edge of the extensions, where shown on **Drawing 4a**.





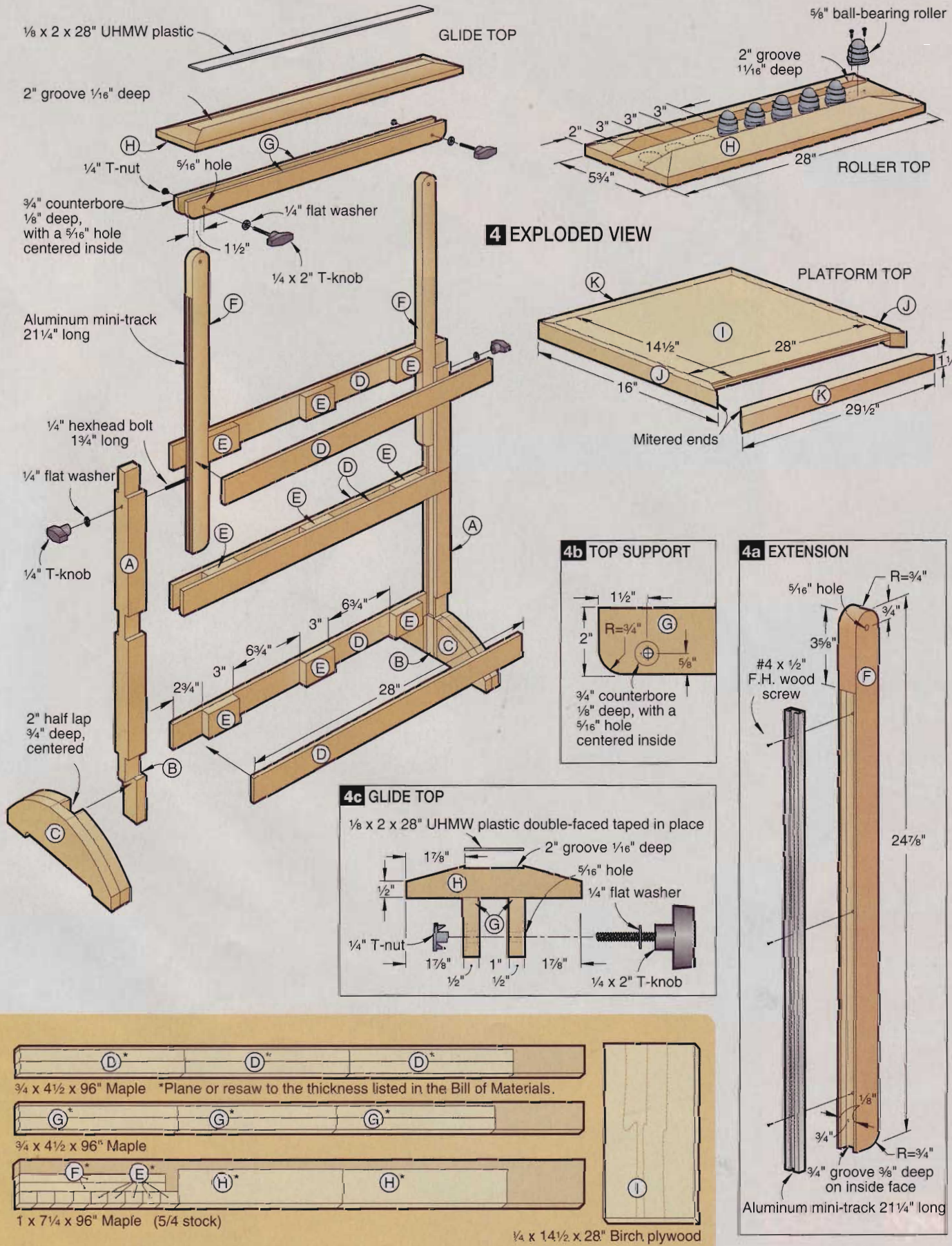
Clamping the spacer jig to the rails helps you accurately position the end spacers.

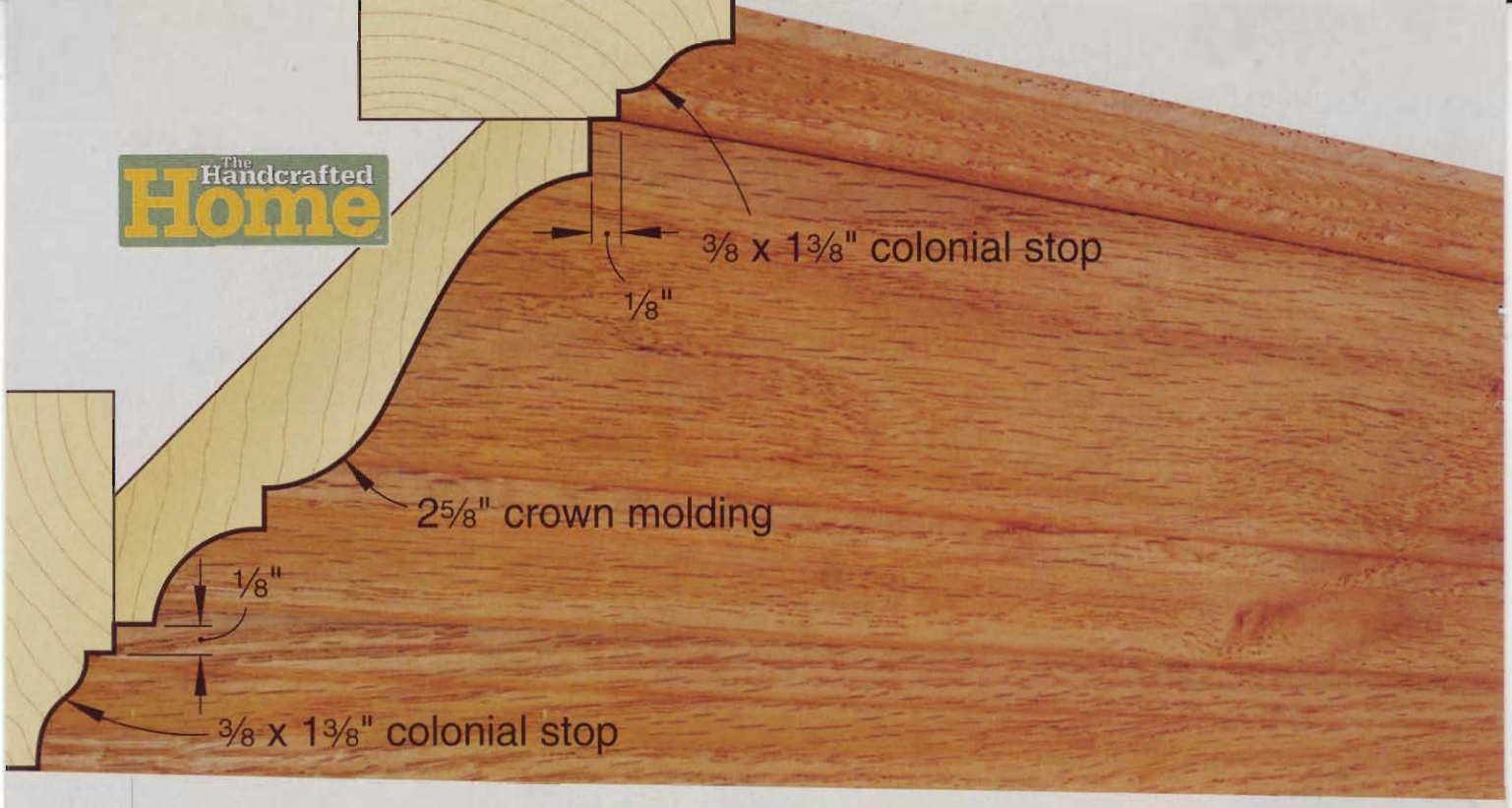
Chuck a ¾" straight bit in your table-mounted router, and in ⅛" increments, rout the stopped grooves, as shown in **Photo B**. Square the ends of the grooves with a chisel.

2 Drill the ⅝" hole, where shown on **Drawing 4a**. Bandsaw and sand the rounded corners. (The bottoms have only one rounded corner.) Cut two pieces of aluminum mini-track (a type of T-track) to length, drill screw pilot holes, and screw the tracks in place. See the Buying Guide for our mini-track source.

3 Retrieve your previously planed ½" stock and cut the top supports (G) to size. Drill counterbores near the ends of three supports, where shown on **Drawing 4b**. Tape a second support to the ones just counterbored, and, centering the bit in the counterbore, drill ⅝" holes through the paired supports. Mark the radius on the corners, as shown, and bandsaw and sand the corners. To ensure

Mark the bit location on your fence. Stop routing when the stop line on the extension aligns with the mark on the fence.


⅛ x 2 x 28" UHMW plastic
GLIDE TOP
2" groove 1/16" deep
H
G
¼" T-nut
5/16" hole
¾" counterbore ⅛" deep, with a 5/16" hole centered inside
¼" flat washer
1½"
¼ x 2" T-knob
Aluminum mini-track 21¼" long
F
E
D
¼" hexhead bolt 1¾" long
¼" flat washer
¼" T-knob
A
6¾"
3"
2¾"
28"
B
C
2" half lap ¾" deep, centered
5/8" ball-bearing roller
2" groove 11/16" deep
2"
3"
5¾"
ROLLER TOP
4 EXPLODED VIEW
PLATFORM TOP
K
J
I
14½"
16"
29½"
1½"
Mitered ends
4b TOP SUPPORT
1½"
2"
R=¾"
5/8"
¾" counterbore ⅛" deep, with a 5/16" hole centered inside
4a EXTENSION
5/16" hole
R=¾"
3⅝"
#4 x ½" F.H. wood screw
24⅞"
⅛"
¾" groove ⅜" deep on inside face
Aluminum mini-track 21¼" long
4c GLIDE TOP
⅛ x 2 x 28" UHMW plastic double-faced taped in place
2" groove 1/16" deep
1⅞"
½"
5/16" hole
¼" flat washer
¼" T-nut
1"
¼ x 2" T-knob
¾ x 4½ x 96" Maple *Plane or resaw to the thickness listed in the Bill of Materials.
¾ x 4½ x 96" Maple
1 x 7¼ x 96" Maple (5/4 stock)
¼ x 14½ x 28" Birch plywood



The Handcrafted Home

give your room the royal treatment with

crown molding

Walk into a room that features crown molding, and you're likely to have a couple of reactions: (1) Boy, that stuff looks great! and (2) How hard could it be to install? People have delighted in the look of crown molding for untold years, so you'll get no argument there. But let us give you some guidance before you start putting it up.

We sorted out the details for you in the process of installing crown in a typical family room. Cabinetmaker and veteran trim carpenter Doug Guyer took us through the paces.

You don't need much equipment to do the job, but a power mitersaw is by far the most practical tool for making the cuts. We'll show you how it's done at simple 45° settings. Although a pneumatic nail gun also comes in handy, you can do the fastening with a hammer and nails.

You'll get terrific results with simple 45° settings on a mitersaw. No tricky compound cuts required!

Backing trim provides a flat surface for the crown molding. Any gaps along the walls or ceiling will be filled with caulk as the last step in the installation.

Check out that profile

Crown molding comes in different profiles and widths. You can use it as is, or add pieces of molding to other profiles to make the effect more elaborate.

We installed molding in a typical family room, with a ceiling that's slightly lower than the standard 8'. A massive crown would overwhelm a room like that, so we used a style that's just 2⅝" wide. You can buy the same profile in several widths, up to 4⅝". We also used ⅜×1⅜" colonial stop as backing trim along the wall and ceiling, forming the profile shown *above*.

We opted for oak to match the existing woodwork, installed it unfinished, then stained it to match. If you plan to paint the crown molding, buy pine or poplar and save money.

Prep the room

Measure the total length of the installation, and figure the least wasteful way to use your molding. Keep in mind that molding commonly comes in 16' lengths. If some runs exceed that, plan to put the end-to-end joints in inconspicuous locations. A stairwell adds another element, and we'll show you how we handled that in our project.

Locate the wall studs and ceiling joists, and make pencil marks that will be hidden by the molding. Now, cut 4" samples of all the types of millwork that will go into your finished installation. Glue them together to make a template that matches the desired profile.

After the glue dries, hold this template against the wall and ceiling and make a mark at the ceiling and wall edges. Our built-up molding assembly extends 2¾" out on the ceiling and 3" down on the wall. Mark the upper trim piece "ceiling" and mark the lower trim piece "wall."

Now go along the walls and ceiling with these templates and make a light, horizontal pencil mark every couple of feet. Those marks will help you keep the backing trim aligned during the installation of your crown molding.

One piece at a time

Before you get to the crown itself, install the ceiling and wall trim pieces all the way around the room, as shown in **Photo A**. These pieces serve a couple of purposes. In addition to building up the crown profile, they help to hide minor bumps and dips in the wall and bridge over any ceiling texture. Our ceiling had a "knock-down" texture that wasn't too troublesome. If you're dealing with a rough "popcorn" texture, carefully scrape it smooth where you'll install the ceiling trim.

Align the wall trim with your pencil marks, and nail it into the studs with 2" finish nails, if you're using a nail gun. If you do the job with a hammer, use 6d nails, and drill a slightly undersized pilot hole in the trim for each nail.

To fit wall trim into an inside corner, run one piece clear to the wall, then miter and cope the adjacent piece. Hold this piece vertically on your mitersaw, flat against the fence, and cut a 45° miter. See the "Learn to cope" section of this article for instructions about coping that mitered end to make a tight joint.

The ceiling trim can pose more problems because you might not be nailing into any framing lumber when you're working parallel to the ceiling joists. Nails set near to one another, but at opposite angles, should hold well enough. Or, use some glue or a small amount of construction adhesive to hold these pieces up. The crown piece will help hold the ceiling trim in place. Ceiling trim requires just a simple 45° miter joint, like a flat picture frame, where it goes around a corner.

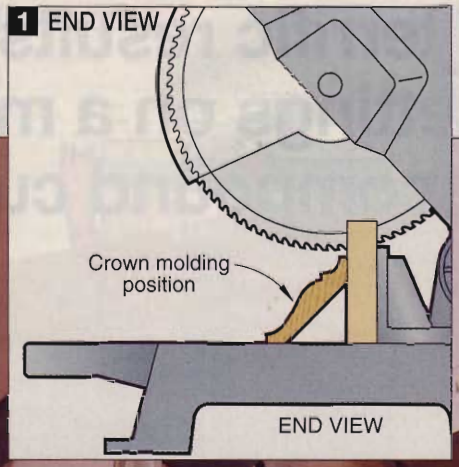
You'll use 1¼" brads to fasten the crown molding to the trim pieces. Brads provide all the holding power you need, while leaving tiny holes that are easy to hide. Place one every 16". Use 1¼" brads if you're hammering them in, and predrill the holes.

Upside down & backward

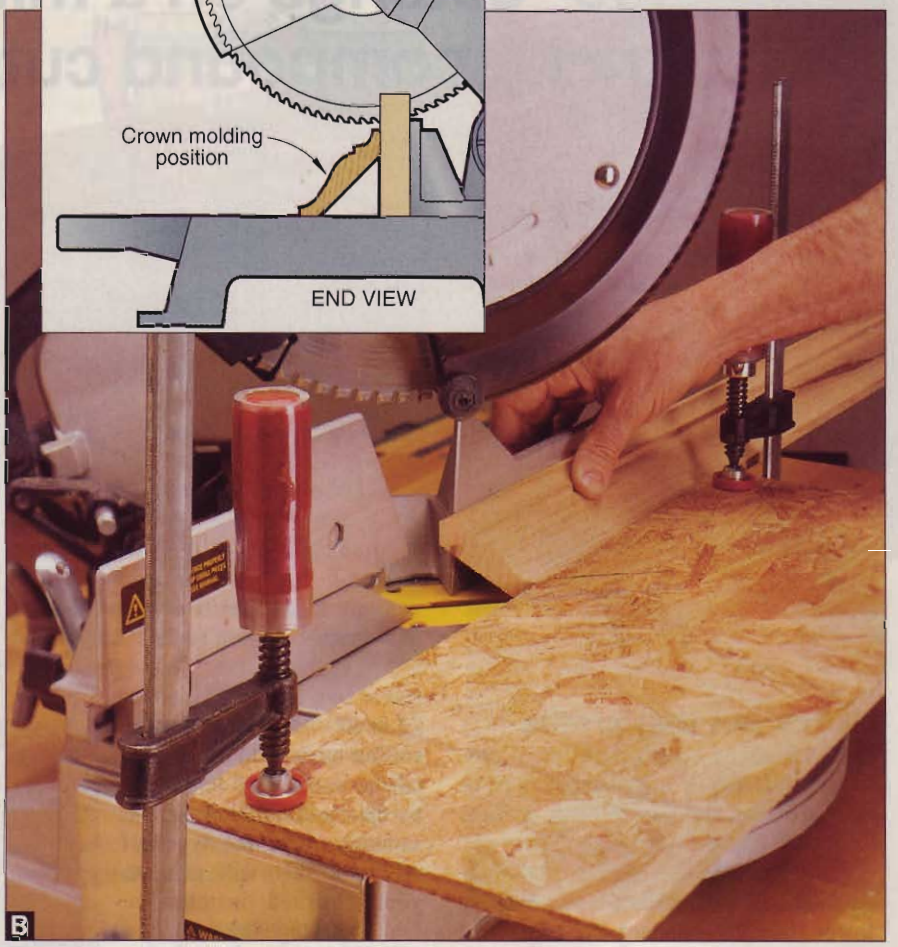
Perfect miters hold the key to a top-notch crown molding installation. You'll cut them for outside corners, inside corners, and for any spot where the molding must come to an end on the wall.

We prefer to cut crown molding as shown in **Drawing 1** and **Photo B**. Place

A brad nailer, powered by a small air compressor, speeds your work and won't split the wood.



A simple guide clamped to the mitersaw keeps the crown molding firmly in place while you make each cut.



Follow the profile exactly with your coping saw, because that's the area that will show in the finished joint. Install the blade to cut on the push stroke, avoiding surface tear-out, and hold the saw approximately at a 45° angle as you make the cut.

the molding at its installation angle, but upside down. The bottom edge goes against the fence and the top edge rests on the mitersaw table. We clamped a piece of scrap on the table to support the molding while we made our cuts.

Set it backward, too. If the cut angle will point to your left on the wall, it points to your right on the saw. With this method, you can cut the miters for any 90° corner at one of the two 45° settings on your mitersaw.

Learn to cope

Outside corners, those that project out into a room, require only the two 45° cuts on the mitersaw. The point on each piece will be on the top edge of the molding, forming the completed shape shown in **Photo C**. Disguise slight gaps by rubbing them with the side of a nail set, burnishing tool, or the like.

An inside corner calls for a different technique. Form a joint that stays tight by running one piece of molding clear to the wall, then coping the adjoining piece. Don't nail the first piece within 2 feet of the wall, so you can adjust it slightly as you fit the joint.

Cut the piece to be coped at 45°, this time forming the point on the molding's bottom edge. Run the edge of a pencil along the face edge of the profile to highlight it, then carefully cut along that line with a coping saw, as shown in **Photo D,** *opposite.*

Hold the saw at about a 45° angle to the face of the molding, and remove any material that might cause a gap on the exposed surface. Test the fit, then use a file or rasp to remove more stock if necessary, as shown in **Photo E**. Keep testing the fit until it's tight. Put the pieces together as shown in **Photo F**, then pin both pieces to the backing trim.

In most cases, you'll start at one corner and work your way around the room, fitting each corner as you go. But if a wall is short enough to be spanned by a single piece of molding, another method comes in handy. Install the molding on both adjacent walls, cut a piece 1/16" longer than the gap, cope both ends, and "spring" it into place.

We held this field joint apart for clarity. In most cases, you'll cut the two pieces to match the wall length exactly, so double-check the fit before gluing.

A few points about joints

Avoid end-to-end joints in crown molding whenever possible. However, you'll have to use them if any of your walls are longer than the pieces you've bought. Here's how to make those joints as unobtrusive as possible.

Angle mating ends on two pieces of molding without changing the setting on your mitersaw between cuts, and they'll match as shown in **Photo G**. Apply yellow glue to one piece, fit the ends together, and nail into the backing trim.

Careful as you might be, you still could find slight discrepancies in the profile when you run your finger across the joint. After the glue dries, lightly sand any high spots.

A good sanding job, combined with the angled joint line, disguises a field joint quite well. Still, plan these joints so that they aren't in the most prominent or brightly lit point in the room.

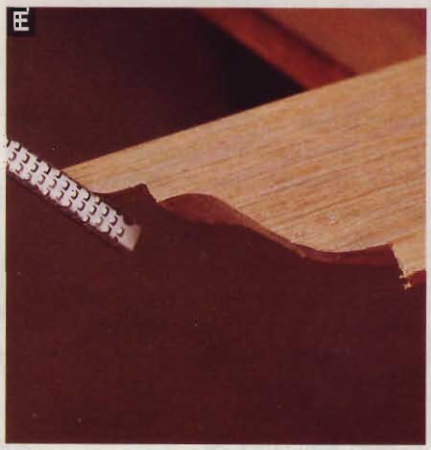
Now, address the return

Our crown molding runs around the lower-level family room until it comes to a stairwell leading up to the main floor of the house. We stopped the molding where the ceiling ends. See **Photo H.**

Measure your ceiling from the corner to the ceiling's edge. Miter-cut the ceiling trim to length and nail it in place. Next, run a short piece of mitered ceiling trim to the neighboring wall to make the return.

Now, cut the wall trim the same length as the ceiling trim and temporarily tack it in place. Position your crown molding on the trim. Before doing so, cut one end to fit against the opposite mitered or coped corner as needed. Using the ceiling trim as a guide, mark the upper edge of the crown molding. Cut the molding at a 45° angle as shown in Cut #1 of **Drawing 2.** Place the molding against the trim and mark the wall trim piece. Set the crown molding aside, and remove and miter-cut the wall trim to length. Nail up the wall trim and follow with the crown molding.

continued on page 54



Stock removal behind the coping cut doesn't have to be precise. Take off enough to be sure of a tight fit.

Move the other piece of molding as needed to get a perfect match with the coped piece. Pin them close to the joint.

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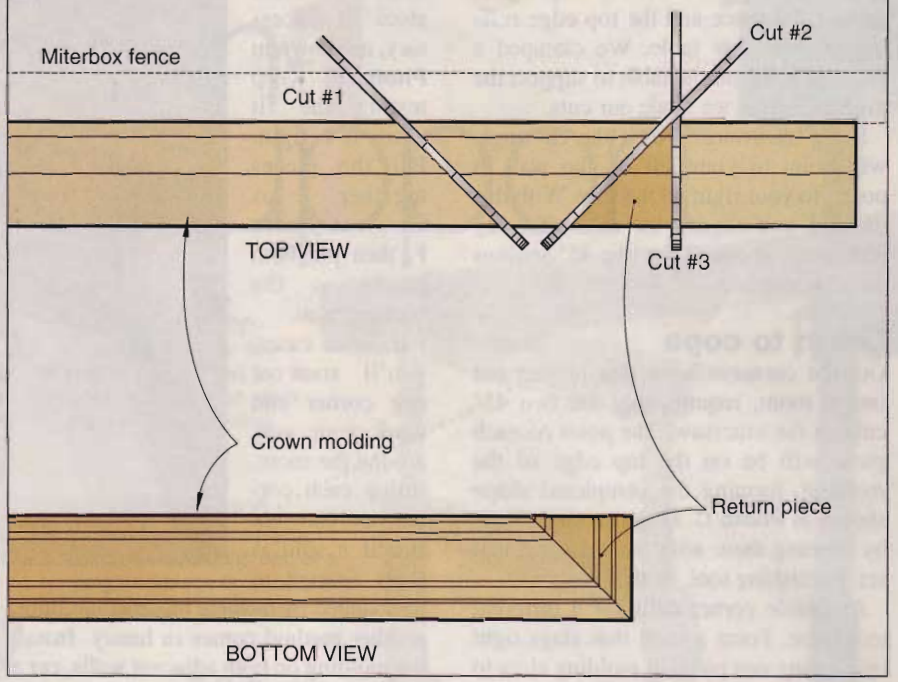
2 CUTTING DETAIL



From a length of wall trim, miter cut one end. Next, make a straight cut to create a small wedge to fit between the wall and the mitered end of the wall trim applied in the previous paragraph. Now, glue this piece in place.

Finally, cut the crown molding return following cut #2 and cut #3 in **Drawing 2.** Glue this in place to complete the corner. Use masking tape to hold the piece in place. Later, press the tapered end of your nailset over the mitered joint to close any gaps. Finish carpenters call this a French roll.

H

A completed return nicely hides the gap between molding and wall. Work carefully, and it will look like a solid piece.

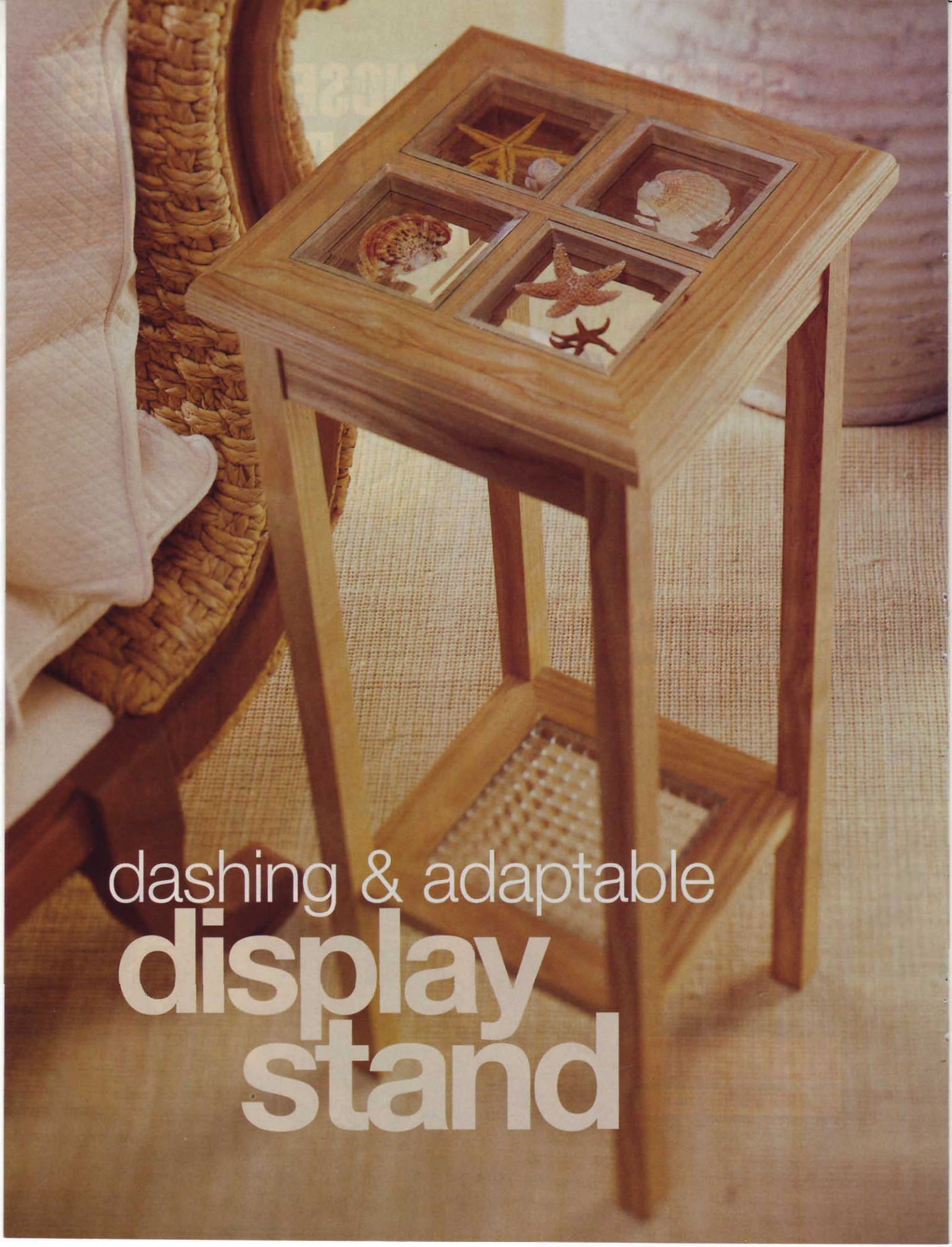
Finish with care

We chose to install the crown molding first, then we carefully applied stain and lacquer. If you prefer, you can finish the molding before installation, but you'll run into a refinishing problem every time you have to sand a joint.

To finish installed molding, protect the walls and ceiling with masking tape. Test your stain on a scrap piece of molding to make sure it matches your home's existing woodwork. Apply the stain to the molding, using a brush, and let it dry. We followed that with two coats of water-based lacquer, also brushed on. Then, we filled the pin holes with putty tinted to match the stained wood, and brushed on a final coat of lacquer.

Finally, apply a fine bead of caulk along the exposed edges of the backing trim. The caulk will cover any remaining gaps between wood and drywall. If your wall doesn't happen to be painted white, you can go back and touch up the caulk with a small brush and paint that matches your wall color.

Written by **Jim Pollock** with **Doug Guyer**
Photographs: **Baldwin Photography**
Illustrations: **Kim Downing**



dashing & adaptable display stand

Patterned-glass panels

Contrasting-wood panels

Stained-glass panels

Looking for a piece of furniture you can personalize? Here it is.

Pound-for-pound, inch-for-inch, you'll be hard-pressed to find a piece of furniture that works harder at displaying your plants, art objects, and collectibles than this stand. It eats up less than a square foot of floor space, yet provides two platforms for medium-size objects. Four ¼"-deep, 3½"-square cubicles in the top let you show off smaller objects, such as coins, photos, seashells, buttons, stamps, pins, or souvenirs, under clear-glass or acrylic panels. Or, you can swap out the clear panels for ones of wood, stained glass, or other materials.

We built our stand of ash, and applied only a clear finish. But this stand's style lends itself to nearly any wood or stain.

First, a base for the stand to stand on

1 Cut the legs (A) to size according to the Bill of Materials. You'll need to thickness-plane the 1" leg stock from 5/4 material, or laminate thinner stock.

2 Using **Drawing 1** as a reference, lay out and cut mortises in the upper inside faces of the legs. We used a drill press to make a series of ¼" holes, then chiseled the walls square.

3 Cut the aprons (B) to size. Form the apron tenons using a tablesaw, dado head, and the setup shown in **Photo A**.

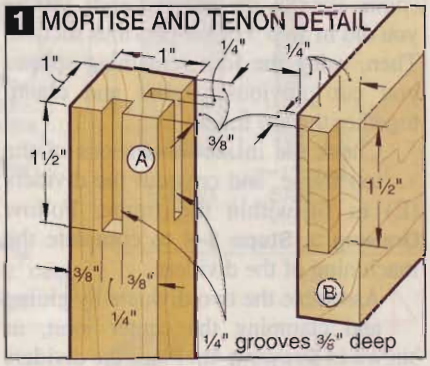
4 From 4/4 stock, cut the bottom shelf frames (C) to size. Drill pocket holes in the bottom faces of the bottom shelf frames, where shown on **Drawing 2**. We used a Kreg Jig (800/447-8638, www.kregtool.com), as shown in **Photo B**. If you don't have a pocket-hole jig, try the low-tech approach described on *page 22*. Then cut a ¼" rabbet ⅛" deep (the thickness of the bottom shelf panel) along the inside edges on the top faces.

5 Miter the corners, and rout spline slots, where shown on **Drawing 2**. Use a router table with fence and a ⅛" slot cutter centered on the thickness of the workpiece. See **Photo C**.

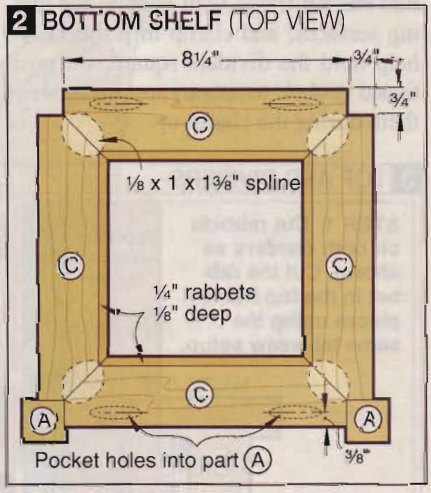
6 Use the full-size spline pattern on *page 59* to cut eight splines from ⅛" hardboard. (You'll need four splines each for the bottom shelf and top.)

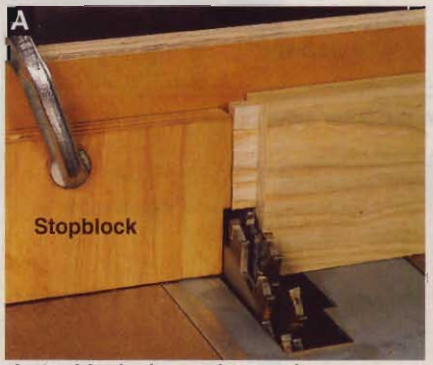
7 Glue, spline, and clamp together the bottom shelf frame. Then glue and clamp together the legs and aprons. With the glue dry, clamp the bottom shelf frame, where shown on **Drawing 4**, then secure it with pocket screws.

1 MORTISE AND TENON DETAIL

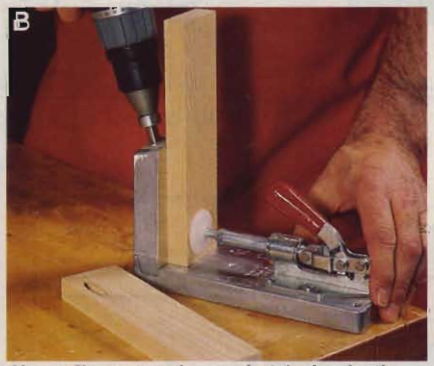


2 BOTTOM SHELF (TOP VIEW)

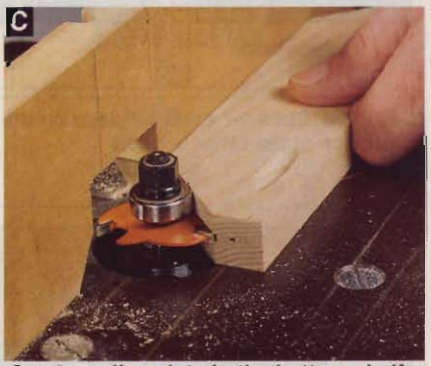




A stopblock clamped to a miter-gauge auxiliary fence helps ensure consistent tenon cuts.



Use a jig to cut the pocket holes in the bottom shelf frames. No jig? See the low-tech approach on *page 22*.



Cut the spline slots in the bottom shelf frames with a ⅛" slot cutter in a table-mounted router with fence.

Tips for making the top

1 Cut the top frame pieces (D) and dividers (E), 1" longer than specified in the Bill of Materials. Cut ¼" rabbets ¾" deep in parts D and E, as shown on **Drawing 3, Step 1**. Note in Step 1 that we used an auxiliary wood fence attached to our rip fence.

2 Miter the top frame pieces to 12" long, using a stopblock to ensure that all of them are the same length. Rout spline slots in the mitered ends just as you did in *Step 5* of the previous section. Then, using the four remaining splines you cut previously, glue and clamp together the top frame.

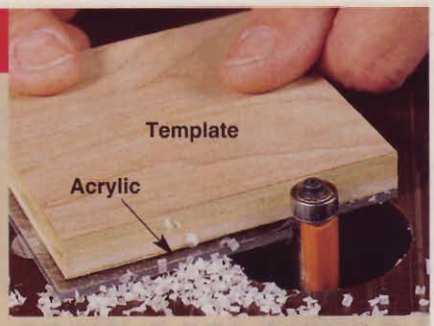
3 Check the inside dimensions of the top frame, and crosscut the dividers (E) to fit within the frame. Follow **Drawing 3, Steps 2–4** to complete the machining of the dividers.

4 Assemble the two dividers by gluing and clamping the center joint, as shown in **Drawing 4b**. Place the dividers into the top frame with glue on the mating surfaces, and clamp in position. To help hold the dividers square, we positioned ⅛x4x4" temporary spacers between them during the clamp-up.

shop tip

How to cut multiple, precisely sized acrylic panels with clean edges. Saw blades slice through acrylic with ease, but the edges they leave behind are usually rough and chipped. Fortunately, router bits cut extremely clean edges in acrylic, provided you take light cuts.

To cut multiple acrylic pieces to the exact same size, first cut the pieces slightly oversized. Then, using double-faced tape, center and attach one piece to a ½" wood template that matches the final width and length of the acrylic panel. Rout the edges as shown with a flush-trim bit in a table-mounted router.



Cut slightly oversized acrylic panels to exact size with a wood template and flush-trim bit.

5 Rout the outer edge of the top frame using a ½" beading bit, as shown in **Drawing 3, Step 5**. To avoid chip-out, make the cut in several passes.

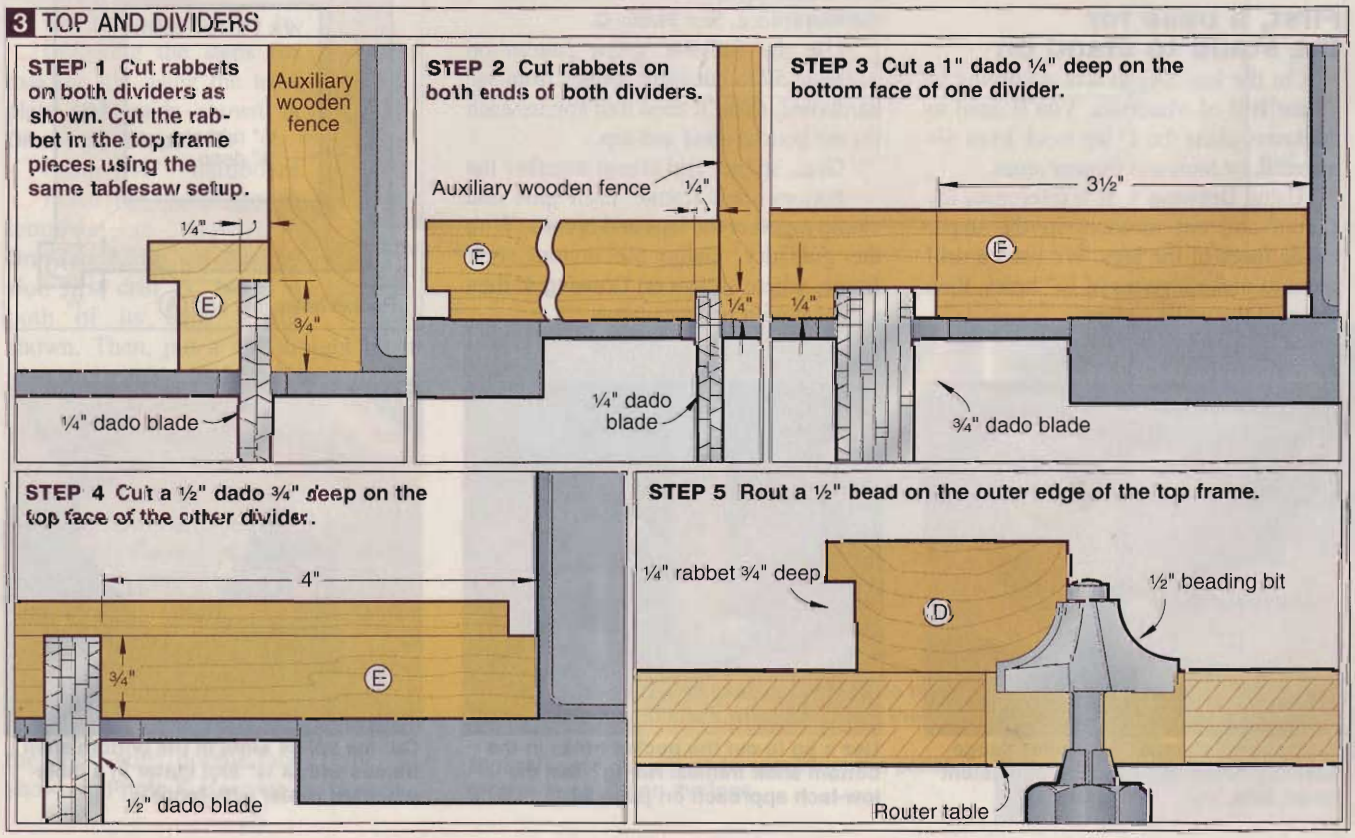
6 Center the top assembly on the base, apply glue, and clamp.

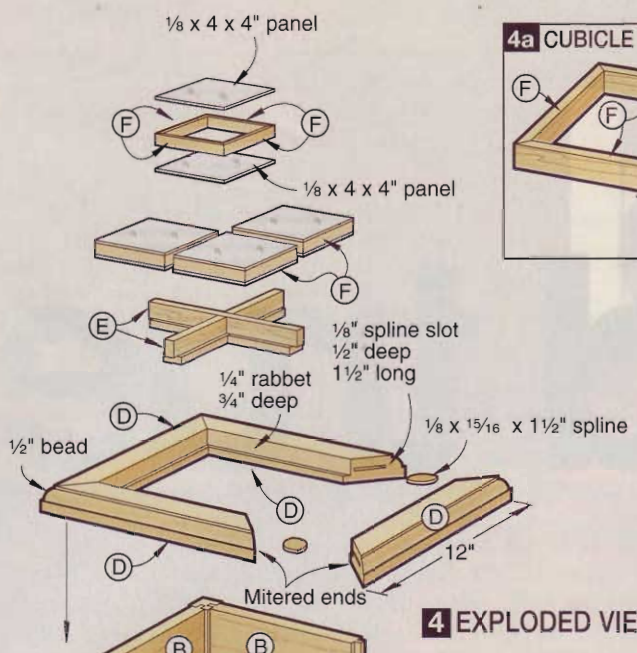
Cut the panels

Note: As shown at the beginning of this article, you can use panels of various materials. Here, and in the Shop Tip above, we'll cover the steps for making ⅛" acrylic panels.

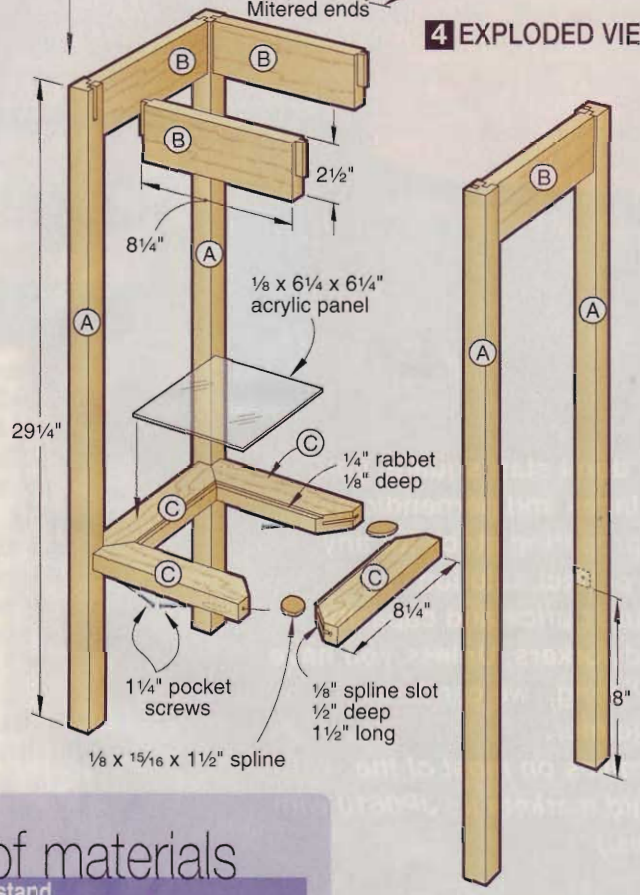
1 Measure the four openings between the dividers as well as the large opening in the bottom shelf. With a 60- or 80-tooth blade, cut the acylic bottom shelf panel oversized by 1/16" in width and length. To prevent chipped edges, outfit your tablesaw's throat with a zero-clearance insert. Set your jointer for a light cut, just 1/64" or so, and joint the sawn edges until the panel fits perfectly.

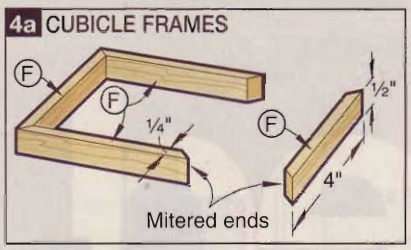
2 Because you'll need eight panels for the top, it's easiest to make a template for cutting them cleanly and pre-

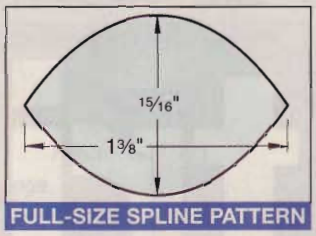

3 TOP AND DIVIDERS
STEP 1 Cut rabbets on both dividers as shown. Cut the rabbet in the top frame pieces using the same tablesaw setup.
Auxiliary wooden fence
¼"
E
¾"
¼" dado blade
STEP 2 Cut rabbets on both ends of both dividers.
Auxiliary wooden fence
¼"
E
¼"
¼" dado blade
STEP 3 Cut a 1" dado ¼" deep on the bottom face of one divider.
3½"
E
¼"
¾" dado blade
STEP 4 Cut a ½" dado ¾" deep on the top face of the other divider.
4"
¾"
E
½" dado blade
STEP 5 Rout a ½" bead on the outer edge of the top frame.
¼" rabbet ¾" deep
D
½" beading bit
Router table

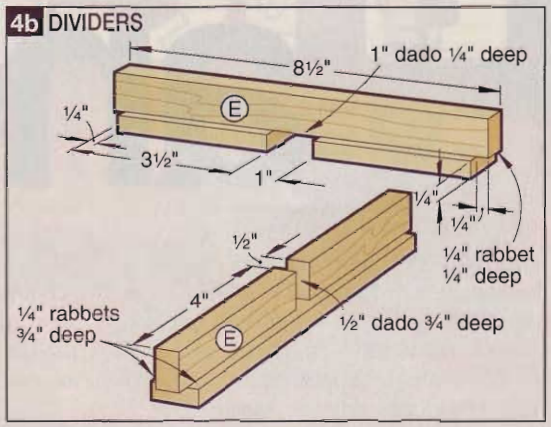


4 EXPLODED VIEW









cisely. Cut the template from ½" stock that's 1⁄32" smaller in width and length than the panel openings.

3 Cut the eight acrylic panels ⅛" larger in width and length than the template. The Shop Tip on the *previous page* shows you how to trim the panels.

Make the cubicle frames, and finish up the project

1 Place two acrylic panels in one of the four openings in the top. Measure from the panels to the surface of the top. Use this measurement—it should be about ½"—when cutting cubicle frames (F) to width according to the Bill of Materials.

2 Cut the parts to size and miter their ends, as shown in **Drawing 4a**. The length of these pieces should match the small acrylic panels. Glue and clamp the frames. Set aside.

3 Sand all surfaces smooth, and apply the finish of your choice. We sprayed on three coats of lacquer, sanding between each coat with 320-grit paper. Then, we applied Minwax Paste Finishing Wax to give the project the look and feel of a fine, hand-rubbed finish. Assemble the components of the top.

Written by **Bill Krier** with **Charles I. Hedlund**
Illustrations: **Roxanne LeMoine; Lorna Johnson**
Photographs: **Baldwin Photography; Wm. Hopkins**

bill of materials

display stand

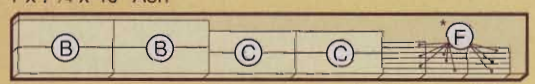
Part	FINISHED SIZE T	W	L	Matl.	Qty.
A legs	1"	1"	29¼"	Ash	4
B aprons	¾"	2½"	9"	Ash	4
C bottom shelf frame	¾"	2"	8¼"	Ash	4
D* top frame	1"	2"	12"	Ash	4
E* dividers	1"	1"	8½"	Ash	2
F cubicle frames	¼"	½"	4"	Ash	16

*Cut these parts oversized according to instructions, and trim to finished size.

Supplies: ⅛x4x4" acrylic (8), ⅛x6¼x6¼" acrylic (1), 1¼" pocket screws (4).

cutting diagram

1 x 7¼ x 48" Ash



¾ x 5½ x 48" Ash *Plane or resaw to thickness listed in the Bill of Materials.

6" jointers battle for the top spot

FAST FACTS

- *For a jointer to produce good results, the infeed and outfeed tables must be straight and co-planer (parallel).*
- *All of the jointers in our test come with quiet, 1-hp induction motors pre-wired for 110 volts; but all can be rewired for 220-volt operation.*
- *Poor technique can negate the performance of a well-tuned jointer. For the best results, after 8–10" of your workpiece has passed the cutterhead, shift your downward pressure to the outfeed side. Look for more tips in the Jointer Pointers article on* page 66.

We put 'em together, then put 'em to the test

After assembling the jointers and cleaning the machined surfaces of protective coatings, we carefully checked the tables and fences for straight, flat, and parallel, using a combination of straightedges, dial indicators, and feeler gauges. If neeeded, we corrected any misalignments. We also examined each jointer's tables and fence for twist using a machinist's 90° angle block and feeler gauges.

Next, we made the chips fly by removing a hefty ⅛" from the faces of a forest of 6"-wide ash boards, and observing each jointer's power under load. With sharp knives, all of the models tackled this task with power to spare, and with no significant slowdown in the number of cuts per minute.

We then edge-jointed the same boards and examined the quality of the cuts, comparing them to both a straightedge and each other. Finally, we used each machine's rabbeting ledge to cut ½×½" rabbets, again noting the quality of the cut produced. All proved up to the task.

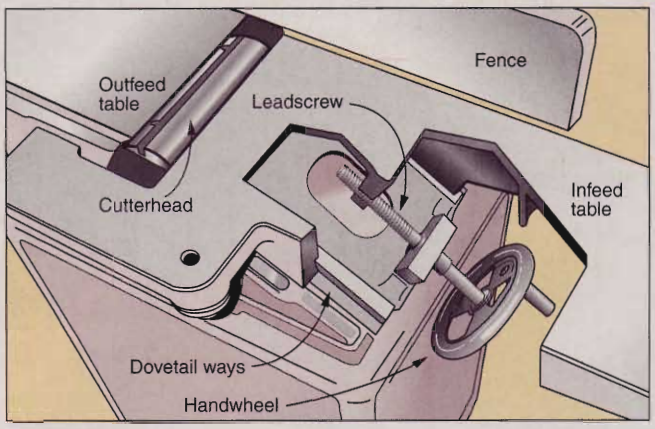
Table talk: their ups, downs, and more

As a rule of thumb, you can successfully straighten a board up to twice the total length of the jointer's bed. (The bed consists of both the infeed and outfeed tables.) With that guideline in mind, most of the tested jointers can handle a board between 92" and 94" long. Give Sunhill's CT-60L the advantage here: Bolted-on extensions boost the length of stock you can work to more than 105"—almost a foot longer than the nearest competitor.

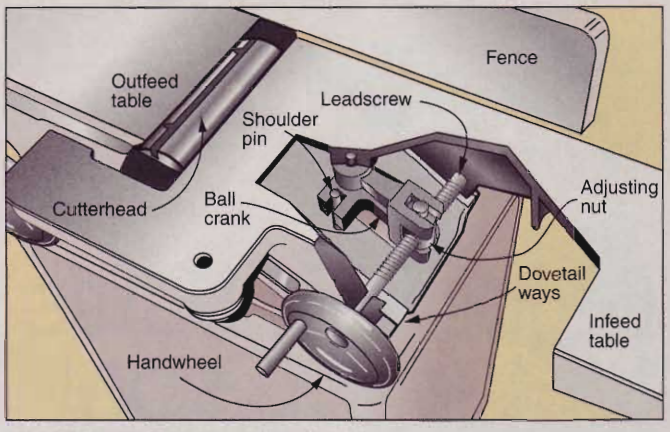
The three infeed-table elevation systems are shown in the drawings at the top of *pages 62-63*, and the side handwheel (*left* drawing) is the simplest and most common style. Rotating the handwheel turns a leadscrew that pushes or pulls the infeed table along its dovetail ways, raising it or lowering it. Grizzly, Ridgid, and Sunhill use this method for both infeed and outfeed tables.

Jet's infeed-table front handwheel (*center* drawing) is easier to access and operates almost as smoothly as side handwheels. But it's also easier to bump when moving stock from infeed to outfeed. To keep from accidentally changing the critical outfeed-table height, also adjusted with a handwheel on the front of the machine, we set the table height and removed the handwheel.

Rather than a leadscrew system, Delta employs a half-nut release system (*right* drawing) that allows you to adjust the cutting depth in precise 1/32" increments. Pulling the cable release disengages the half-nut from the threaded rod so you can step the table up or down or freely



SIDE HANDWHEEL ELEVATION



FRONT HANDWHEEL ELEVATION

move the table to any height with the positioning lever. Let go of the cable release, and the table stays put. This design works fast for gross adjustments, but we missed being able to tweak the depth of cut just a nip, as we could on the handwheel-equipped jointers.

As for table flatness, we're quite impressed by most of the machines in our test, as you can see by the chart on *page 64*. And, except for the Jet infeed table, which sagged .012" at the outboard end and required a little shimming to correct, all of the jointers arrived with their tables in near-perfect alignment. (John Otto of Jet Equipment and Tools told us that the .012" misalignment was far beyond their acceptable tolerance, and that the jointer likely was damaged in shipping.)

Now, factor in the fence

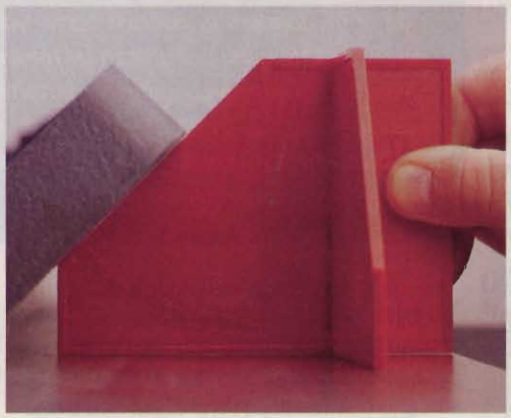
When edge-jointing material, the fence provides the vertical stock support and holds the bevel angle. Most of the time, that angle will be 90° from the table, but the fence also can be set to edge-bevel material at any angle from 45–135°, with stops at both ends of the scale and at 90°.

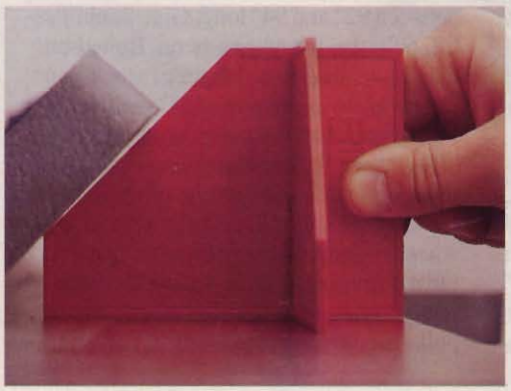
The 45°, 90°, and 135° bevel stops on the Delta are pretty simple, each consisting of a bolt and a nut to lock the stop once set. We found these stops solid, accurate, and easy to adjust. The other four jointers use the same type of stops for their 90° and 135° settings.

But the 45° stop on those models consists of a pair of nuts on the end of the fence's center bevel-locking rod to limit the fence tilt. This design tended to change the bevel angle—up to 2° in our tests—when we locked in the 45° bevel (see photos *below*). And, those two nuts are surrounded by the fence-base casting, making them difficult to access and adjust.

When we called this to the attention of the manufacturers, most suggested setting the stop so it is accurate when locked, regardless of the angle when unlocked. However, Ridgid's Dave Hazelwood told us that engineers will add a third stop bolt for the 45° setting and eliminate the double-nut stop on the center rod of the JP0610.

Delta also scores points for its 5"-tall fence—a full 1" taller than the rest in the test. The extra height offers better workpiece support for edge jointing, especially on wide workpieces.





We used Ridgid's angle-setting gauge to position a jointer's fence at 45° (above). But when we tightened the locking knob, the angle opened up to just over 47° (below).

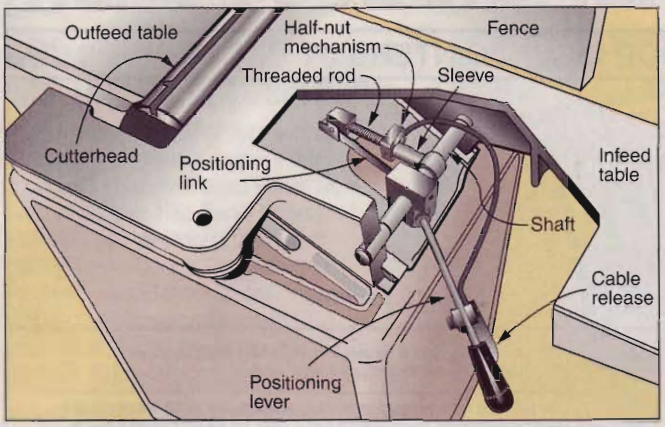
More features that make jointing a joy

•***Depth-of-cut scales and stops.*** Let's face it: If you use a jointer primarily for flattening and straightening lumber, an accurate scale isn't a high priority (although it might be if you plan to do a lot of rabbeting). All of the machines have an easy-to-calibrate scale—in the *WOOD*® magazine shop, though, we just rarely find ourselves using it, except as a guideline.

However, it's worth noting that the Delta, Jet, and Ridgid jointers have a depth stop at ⅛"—the maximum safe depth of cut you should take in most circumstances—that you can bypass if you choose to. Sure, you can still take a deeper cut, as you might for rabbeting, but you have to make a conscious decision to do so. We like this safety feature.

•***Dust collection.*** As much as we harp on the benefits of good dust collection in the shop, we won't go to battle here. Why? Mostly because the dust chutes on these machines eject the chips harmlessly just inches above the floor.

And frankly, the volume of waste produced on large projects can quickly fill a dust-collector bag. That's why for big jobs, we like to let the



HALF-NUT LEVER ELEVATION

chips fall where they may (ahem), where we can simply scoop them into the trash at day's end. A dust-collection port comes in handy to save cleanup after small jobs, though.

You can buy a dust-collection port for any of the machines that don't offer them as standard equipment (see the chart). With only a couple of twists on two thumbscrews, though, Ridgid's innovative dust port slides up and out of the way for the big jobs or to clear a chip jam, then slides back into place for those tasks where you'd like a little suction assist. Every other machine we tested requires a wrench or screwdriver to remove the dust port.

•***Power switches.*** Instead of a base-mounted switch that can be hard to find, Delta placed the power switch for all the world to see: high above the tabletop on a stalk (see photo on the *next page*). We also liked its covered toggle switch that turns off with a press of the cover.

•***Knife changing/setting.*** Unlike the 6" jointers of even a few years ago, all of

Can't afford a jointer yet? Here's one great alternative

If you buy lumber pre-planed to thickness, your craving for a jointer probably pops up only when it comes time to edge joint boards. Here's a method for making perfect edge joints with a router and ½" straight or downcut spiral router bit.

(Note: The router bit is cutting in both directions at the same time, making it grabby during this operation. Proceed with caution and remove as little material as possible on the climb-cutting side.)

Clamp the boards you want to join to the jaws of a clamping workstation (such as a Workmate), leaving ¼" or so of the workpieces overhanging the jaw opening. Close the jaws until the boards are edge to edge, and make witness marks across the joint. The straight edge is set to remove less than 1/32" from the right board.

Open the jaws of the workstation so that the gap between the workpieces is parallel and 1/16" wide. Rout the mating edges of both pieces with one pass of your router, guiding it along the straightedge. Both sides of the cut will match as long as you align your witness marks when gluing up the assembly.

tune-up tips:

The order of business

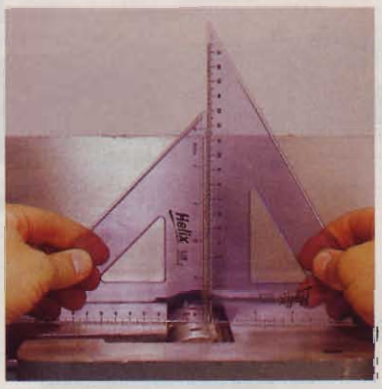
If you're not getting good results from your jointer, maybe it just needs a good tweaking. Follow these five steps, in order, to bring your jointer's performance back up to snuff:

1. **Parallel the tables.**
2. **Square the fence to the table.**
3. **Parallel the knives to the outfeed table.**
4. **Match the outfeed-table height to the knives.**
5. **Test and readjust if necessary.**

Not every machine's owner's manual covers every step, so we've created a downloadable seminar at our WOOD ONLINE® Web site that describes the process in detail. To access the seminar, simply go to www.woodonline.com, click on Shopping, then on WOOD STORE® in the drop-down menu, then select Downloadable Seminars. Once there, choose "Tuning Up Your Power Tools Part 2." Besides jointers, this seminar explains how to keep your tablesaw and portable planer in top shape, too.

If you don't have access to the Internet, you can get a reprint of the article as it appeared in issue 91. Send a $5 check to:

WOOD Article Reprint Service
Tool Tune Up #91
P.O. Box 349
Kalona, IA 52247



You don't need a long, precision straightedge to parallel your jointer tables. A pair of inexpensive drafting triangles does the trick, as you'll learn in our power tool tune-up seminar at WOOD ONLINE.

THE STRAIGHT SCOOP ON 6" JOINTERS

MANUFACTURER/ IMPORTER	MODEL	TABLES: BED LENGTH (INCHES)	TABLES: INFEED ADJUSTMENT TYPE (1)	TABLES: DEPTH OF CUT STOP?	TABLES: FENCE HEIGHT (INCHES)	PERFORMANCE RATINGS (2): TABLES: PARALLELISM	TABLES: FLATNESS	TABLES: HEIGHT LOCK	TABLES: STRAIGHTNESS	FENCE: 45° STOPS (3)	ACCESSORIES (4): STANDARD	ACCESSORIES (4): OPTIONAL	CORD LENGTH (FEET)	WARRANTY (YEARS) (5)	WEIGHT (POUNDS)	SELLING PRICE (6)	COMMENTS
DELTA	37-195	46 1/4	HN	Y	5	G	G	G	G	E	D, P		8	2	225	$550	A departure from the rest of the pack with unique table-height adjustment, fence mechanisms, and stalk-mounted power switch.
GRIZZLY	G1182HW	47	SH	N	4	E	E	E	E	G	P	D	10	1	205	325*	The tables and fence on this jointer checked out within .001" of flat and parallel. The base cabinet requires assembly and rattled at times, but low price makes it easy to overlook these shortcomings.
JET	JJ-6CSX	45 3/4	FH	Y	4	G	E	G	E	G	D, P		6	2	258	499	Front-mounted handwheels are easy to access but also easy to bump with a knee. We removed the outfeed wheel after setting the table to prevent accidental change.
RIDGID	JP0610	45 3/4	SH	Y	4	G	E	G	G	*	A, D, P		10	L	213	449	Nice onboard tool storage for dust port, pushblocks, angle gauges, and wrenches.
SUNHILL	CT-60L	52 3/4	SH	N	4	E	E	G	G	F	P	D	6 1/2	1	220	359*	Good quality and value with the longest bed in the test. The fence-tilt lock tended to pull the fence out of alignment at 45° position.

NOTES:

1. (FH) Front handwheel
   (HN) Half-nut with cable release
   (SH) Side handwheel
2. E Excellent
   G Good
   F Fair
3. (*) See discussion on *page 62.*
4. (A) Angle-setting gauge
   (D) 4" dust-collection port
   (P) Pushblocks
5. (L) Lifetime warranty against defects in materials and workmanship.
6. (*) Plus shipping where applicable.

For specifications on other types of tools, click on "Tool Comparisons" at www.woodmall.com.

For more information, contact:

Delta
800/438-2486
www.deltamachinery.com

Grizzly
800/523-4777
www.grizzly.com

Jet
800/274-6848
www.jettools.com

Ridgid
800/474-3443
www.ridgidwoodworking.com

Sunhill
800/929-4321
www.sunhillmachinery.com

Delta 37-195

Grizzly G1182HW

Jet JJ-6CSX

the models in our test come equipped with jackscrew cutterheads. These countersunk set screws in the knife slots make it easy to finely adjust the blade height, and to return freshly sharpened knifes to the same height without fussing with a knife-setting gauge. Grizzly's jackscrew-equipped cutterhead also includes springs to use if you choose. (We simply removed them.)

•***A place for your stuff.*** All of the jointers we tested come with pushblocks for safely moving material over the cutterhead. Only the Ridgid jointer provides on-tool storage for the pushblocks and knife-setting wrenches.

Which model would we have in our joint?

You might not expect much from a machine that costs only $325, plus $48 shipping, but Grizzly's G1182HW arrived with the fence and tables within .001" of being perfectly flat and parallel—the best in the test. If you're like us, you rarely use your jointer for anything but making boards flat and square, so we can overlook (or compensate for) the slight pulling of the bevel angle at 45°.

Ridgid's redesigned JP0610 comes nicely featured with on-board tool storage, quick-swap dust port, and—with the change in the 45° stop—solid bevel stops. Only you know if those features are worth another $100 or so to you.

Two more too fresh to test

During the course of our testing, we learned of two new 6" jointers, from Craftsman and Powermatic, slated to be off the drawing board and on the market about the time you read this. Hard as we tried, we couldn't get the models in time to test them for this article. We'll test them for a future issue of *WOOD®* magazine, but here's what the manufacturers say you have to look forward to.

Craftsman 21706

Powermatic 54A

•***Craftsman 21706.*** Due in August 2001, this machine has 6⅛"-wide knives, a jackscrew cutterhead, and a 46"-long bed. Instead of the handwheels found on the model it replaces, the 21706 uses a lever for setting the infeed-table height—a step backward, in our opinion. It also offers onboard storage for the included pushblocks, and is expected to sell for $400.

•***Powermatic 54A.*** The first feature Doug Kullmar of Powermatic boasts of this new jointer is its unique infeed-table adjustment system. Besides having a lever for making coarse depth-of-cut adjustments quickly, the 54A also has a second fine-tuning adjustment for precision when necessary.

And this 6" jointer measures in one way like an 8" model: Its bed length—a whopping 66"—is more than 13" longer than the longest tables in this test. Kullmar expects the 54A to sell for about $750 when it debuts late this summer.

Written by **Dave Campbell** with **Dave Henderson**
Photographs: **Baldwin Photography**
Illustrations: **Tim Cahill**

Ridgid JP0610

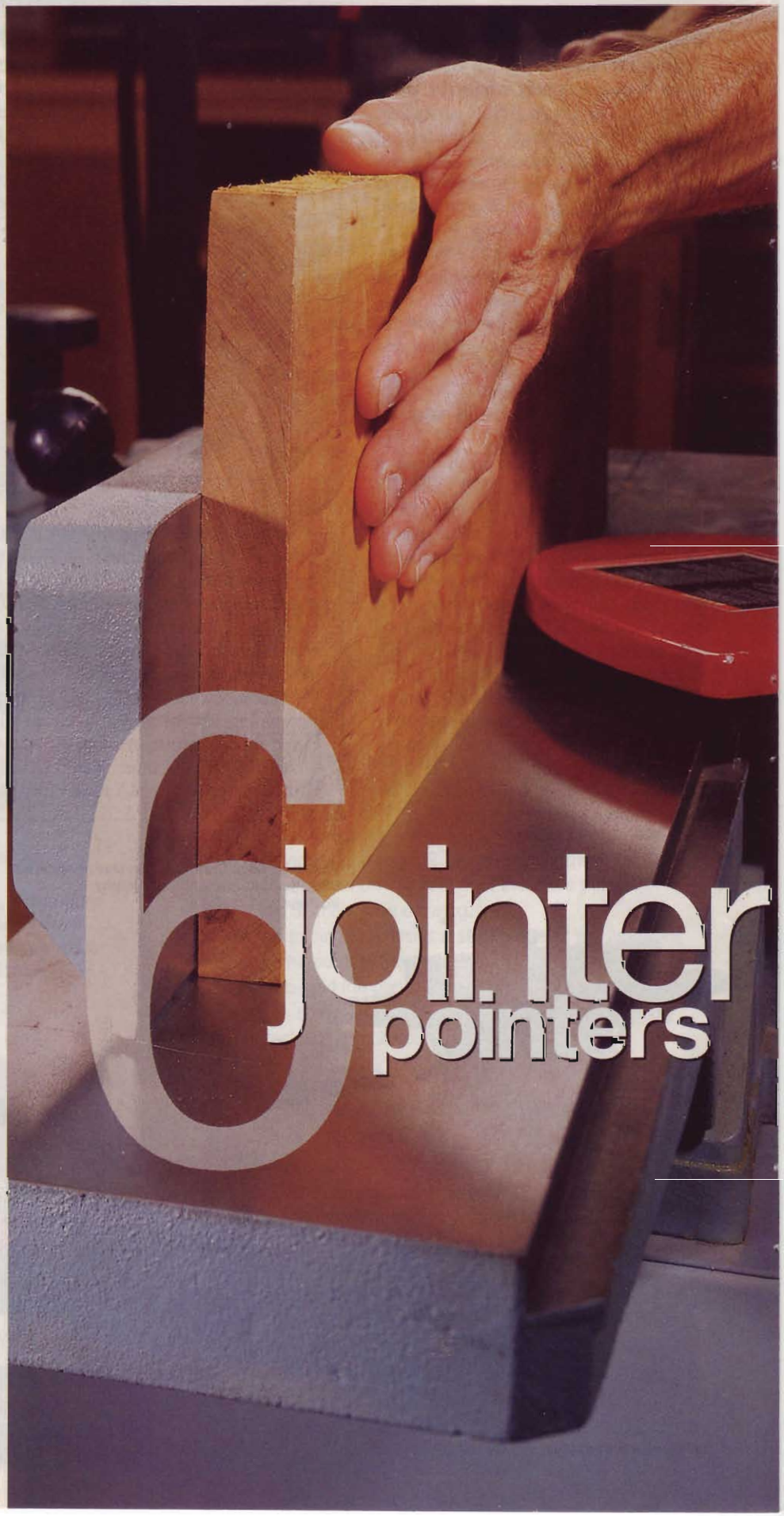
Sunhill CT-60L

We'd like to know what you think

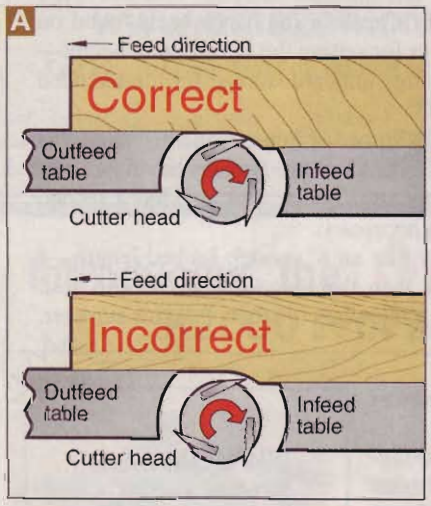
We've had our say, now we'd like to know what you think about the 6" jointers in our test. So we've set up a special online discussion group where you can speak your peace. First, log on to www.woodmall.com, then click on the Tool Comparisons tab to see how other woodworkers and the jointer manufacturers themselves respond.

6 jointer pointers

These simple techniques will ensure that your jointer really earns its keep. You'll not only appreciate this workshop workhorse more, you'll get better results and greater production, too.



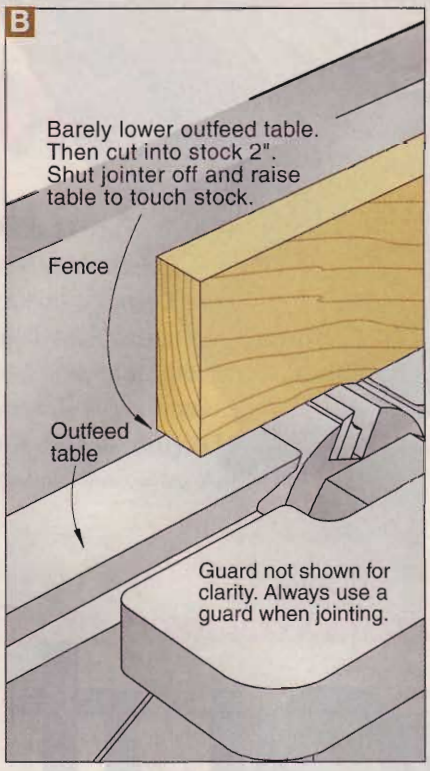
1 Always joint downhill. When edge-jointing, you have to read the grain for the correct direction to feed the stock to avoid tear-out. As shown in **Drawing A**, feeding stock with the grain running "downhill" from the outfeed table and away from the knive's rotation



produces the best results. If grain runs in several directions, position the board so that most of it runs in that direction. End grain generally should not be jointed because the knives will shatter any unsupported portion of it.

2 A quick adjust for outfeed. A misaligned outfeed table results in less than perfect cuts. Set too high, you get a concave surface. Too low, and the cut will be heavier at the back end of the stock. But it doesn't take much effort to set the outfeed table to match the height of the knives for a perfect cut.

As shown in **Drawing B**, first lower the outfeed table slightly, next turn on the jointer. Set the infeed table for a light cut, then slowly feed a piece of scrap-


B
Barely lower outfeed table. Then cut into stock 2". Shut jointer off and raise table to touch stock.
Fence
Outfeed table
Guard not shown for clarity. Always use a guard when jointing.

stock on edge across the knives. Cut into the stock a few inches until about 1" projects over the outfeed table. Now, shut off the machine. Raise the outfeed table until it touches the bottom of the stock's jointed portion, then lock it in place. To check the new setting, finish jointing the edge and make a second pass, pausing 2" into the cut to see if the outfeed table now fully supports the wood.

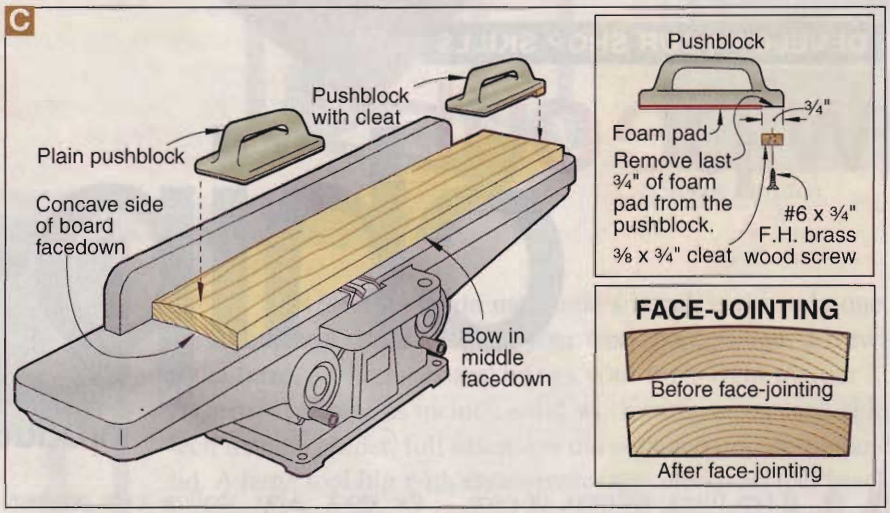
3 Joint the face first. To get a jointed edge that's square to the face of a board, you should joint the face first. Then, with the newly jointed face against the fence (with the grain running downhill), joint one edge square with it. This gives you one flat surface as a base for further milling and a true edge for ripping.

4 Edge-join perfectly. To edge join boards without minute gaps in the glue lines caused by a slightly out-of-square fence, try this. Select the good face of each board. Then edge joint one board with its good face away from the fence. Run the next board through with its good face against the fence. The two edges of the joint will mate perfectly, even if the fence was not perfectly square with the jointer table. Glue-up, then repeat for more width.

Joint safely

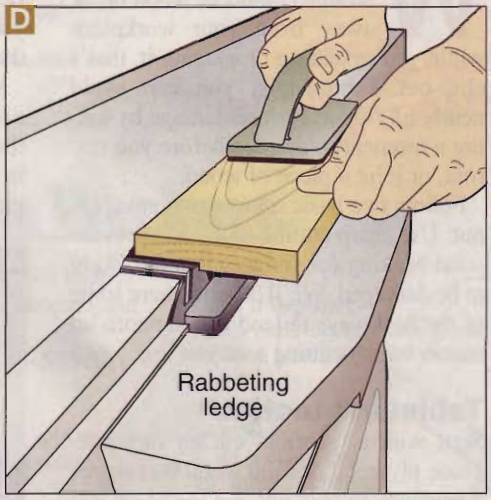
As with most woodworking power tools, a jointer can bite if you're not careful. To avoid an accident, always keep the following important safety tips in mind.

- Wear safety glasses and adequate ear protection.
- Be sure the knives are sharp.
- Tightly secure the fence and table-adjustment locks before using the machine. And check them occasionally during operation, with the jointer off.
- Never make adjustments when the jointer is running.
- Don't try "freehand" manipulations that do not require use of the fence.
- Avoid heavy cuts that might jam the cutterhead. Take off no more than 1/16" per pass on softwoods and even less on hardwood stock.
- Never joint workpieces less than 3/4" wide or 1/4" thick. Use pushblocks or hold-downs on wood narrower than 3".
- When surfacing stock, keep both hands on top of the workpiece, and use pushblocks.



5 Flatten the cup. Take at least half of the cup out of warped boards on your jointer. To do it, first flatten the concave side by face-jointing. Then remove the convex side of the warp by running it through your planer with the new flat side down. As shown in **Drawing C**, a shop-altered pushblock helps get the job done safely.

6 Rabbets work, too. For precision rabbets, you can choose a tablesaw with a dado set, or a router and rabbeting bit. But do you ever think of rabbeting with your jointer? Of course, your machine has to have a rabbeting ledge on the outfeed side. And you must remove the guard. Do so, and you'll get smooth-surfaced rabbets with minimal set-up time. The width of the rabbet will be limited to the length of the cutterhead and its depth by your machine's maximum cut.



Make an initial cut to the width and depth of the rabbet at the tablesaw. Then set the jointer fence to the rabbet's width, and start plowing away in shallow passes, as shown in **Drawing D.**

Photograph: **Baldwin Photography**
Illustrations: **Roxanne LeMoine, Tim Cahill**

DEVELOP YOUR SHOP SKILLS

wipe out chip-out

Prepare before you cut, and produce smooth, clean edges.

When fibers, splinters, or even sizable chunks of wood break away from your workpiece while you're cutting or shaping it, that's chip-out. Fortunately, you can avoid nearly all of that surface damage by taking a moment to prepare before you cut, rout, or joint a piece of wood.

Follow two basic rules to prevent chip-out: Use sharp cutting tools, and provide solid backing for surfaces that are likely to be damaged. We'll describe here some of the best ways to lend that support, no matter which cutting tool you use.

Tablesaw tactics

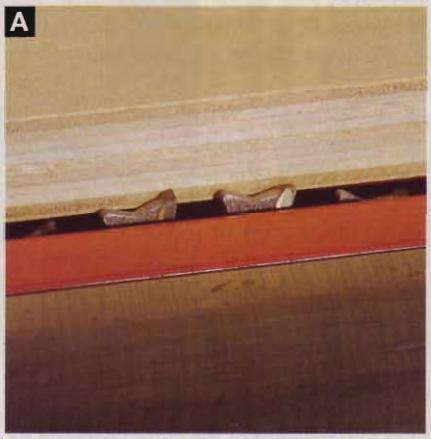
Start with a "scoring" cut on furniture-grade plywood or solid wood that shows a tendency to chip out. Set the blade just ⅛" above the table, as in **Photo A**, and run the workpiece through. Then raise the blade and make the final cut.

You'll get cleaner results because in a scoring cut the blade's teeth meet the wood at a shearing angle, rather than pushing down on the bottom surface of the stock. Also, shallow cuts produce better results than deep ones because you're not forcing as much sawdust through the kerf.

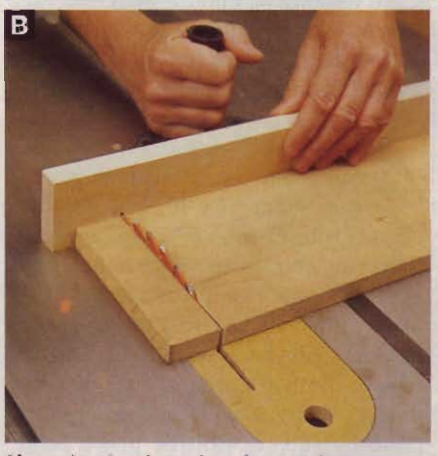
When crosscutting with a miter gauge, use an auxiliary wooden fence to back the workpiece in line with the blade, as in **Photo B**. Most traditional miter gauges include screw holes that you can use to add an auxiliary fence. If you have an extruded-aluminum fence on your miter gauge, use double-stick tape to attach a temporary wooden fence.

Router know-how

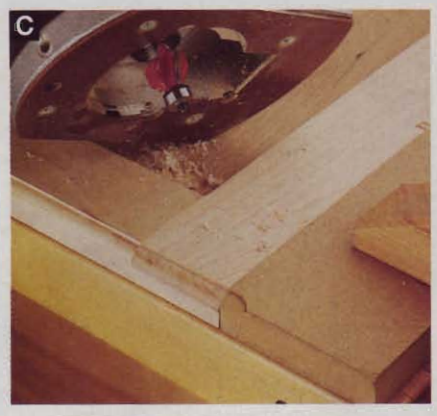
The best way to avoid chip-out when routing an edge profile is to make several shallow cuts, rather than cutting the



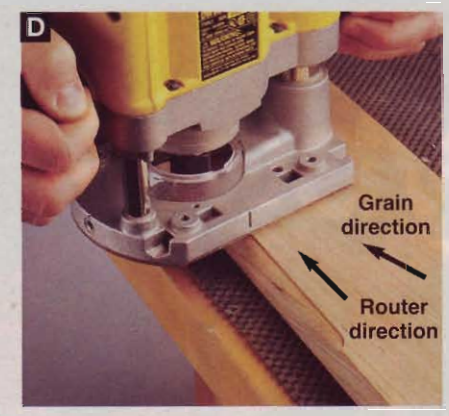
When handling top-quality materials on the tablesaw, start with a scoring cut.



Use a backer board and zero-clearance throat plate to save on clean-up time.



Always provide support at the end of the pass when routing across end grain.



If the wood's face grain runs at this angle, use a climb-cut to rout a profile.

finished shape in one massive, wood-chewing pass. If you're working on the end grain of a solid board or a rail-and-stile assembly, which also requires you to handle some end grain, clamp a backer board alongside the end grain, as in **Photo C**.

Or, rout the edges that include end grain first, then do the ones that are all edge grain. That way, if you knock some slivers loose while pushing across the end grain, you'll clean up that spot with the edge-grain pass.

If your workpiece displays a tendency to splinter when you begin routing an edge profile, it's time for climb-cutting. This can be a tricky operation, so exercise extra caution. Here's how it works.

Typically, you rout an edge profile by pushing the router forward with the workpiece to your left. Because the bit spins clockwise, this action pushes the cutting edge into the wood. To climb-cut, keep the workpiece at your left, but start the router at the far end of the cut and pull it toward you, as in **Photo D**. Now the bit's cutting action pulls the grain down, instead of lifting it up, and that reduces the likelihood of chip-out.

The router thrusts toward you when you climb-cut, so clamp the workpiece securely, take a balanced stance, grip the router firmly with both hands, and make light cuts. Remove no more than ⅛" of stock per pass when using small bits and only about 1/16" with larger ones. Don't climb-cut with bits over 2" in diameter, which create a tremendous amount of torque. Don't make climb cuts on the router table, either, where the workpiece is likely to shoot out of your grasp.

Jointer tricks

Sometimes you need to trim the ends of a rail-and-stile frame, and the jointer can do that in a jiffy. But it's almost certain to splinter the edges of the stiles unless you take precautions.

One method is to hold or clamp a block of wood against the rear edge of the workpiece. We show another approach in **Photo E**. Push the piece far enough to trim all of the first stile, then pick it up, flip it around, and finish the cut from the opposite end. These same principles apply to hand planes, too.

Basic baseplates

Bandsaws, scrollsaws, jigsaws, and portable circular saws will give you a much smoother cut if outfitted with a zero-clearance baseplate to provide backing on both sides of the kerf. As an example, here's how to prepare a circular saw.

Cut a piece of ¼" hardboard or plywood to the size and shape of your saw's base. Drill holes in the board to match the base's existing holes and attach it with countersunk machine screws and nuts. Our saw has holes only along one edge of the base, so we secured the other edge with cloth-backed, double-stick tape.

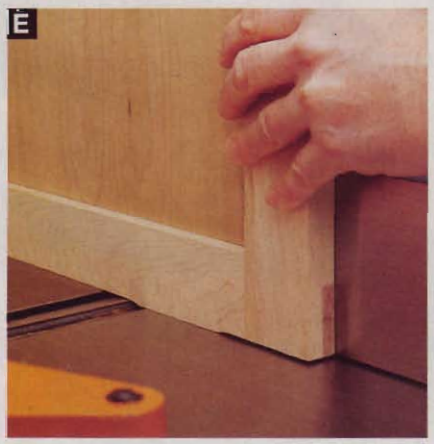
Retract the blade, and set the saw on a double thickness of ¾" plywood so that you don't saw into your workbench. Switch on the saw, lower the blade, and you'll get the result shown in **Photo F**.

You can't guide the saw by eye with this baseplate attached, so you'll have to rely on edge guides. Or, you can make the baseplate with clear Plexiglas or polycarbonate plastic.

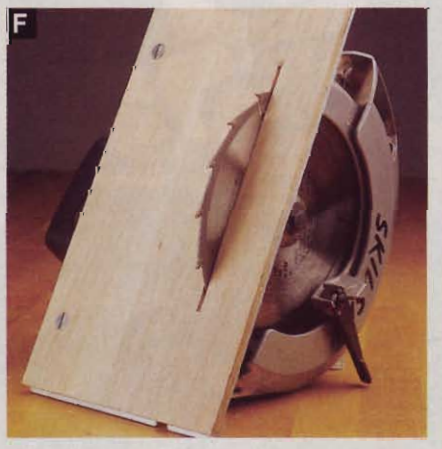
More anti-chip tips

Different situations call for different measures to beat chip-out. Here are some more tips:

- Score the top side of plywood with a utility knife and a straightedge before cutting with a circular saw. The side of the saw blade against the "keeper" edge should run in the scored cut.
- When routing a hinge mortise, first make a knife cut at the point where the bit will emerge from the wood.
- If you do get minor chip-out with the tablesaw, clean it up at the router table. The ideal bit for this step is an up/downcut spiral bit.
- Apply a thin coat of the finish you'll use later. It hardens the surface of the wood, and can be scraped or sanded off if necessary.
- Use a backer board when using the drill press, and move the board along with the workpiece for multiple holes. That way, you'll always have solid support underneath.



To trim a frame, start one end through the jointer, then turn it around.

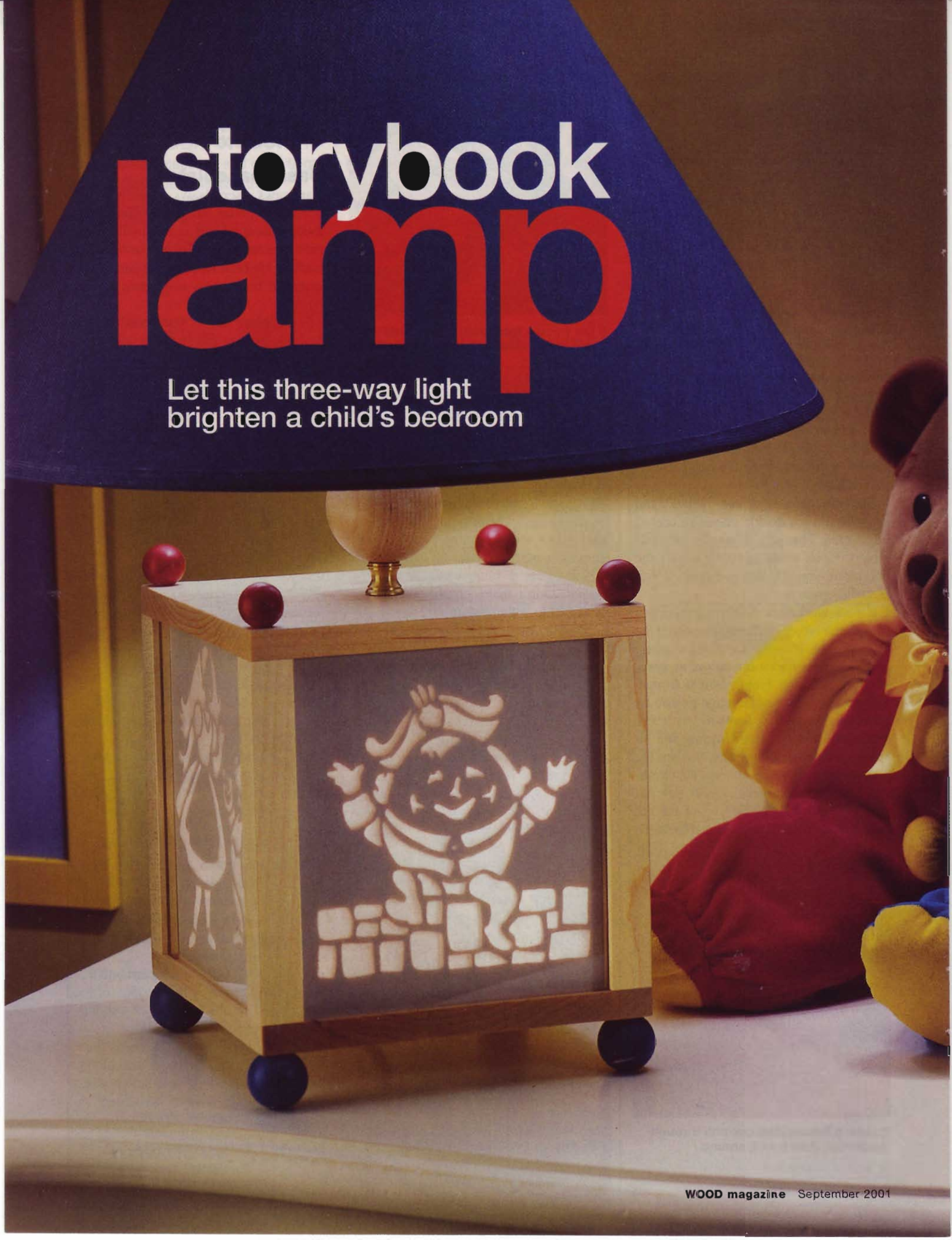


Zero-clearance jigs, like this one, hold wood fibers in place as you slice them.

Photographs: **Baldwin Photography**

storybook lamp

Let this three-way light brighten a child's bedroom



This enchanting tabletop lamp not only looks great sitting on a child's dresser, it also features unique lighting options. A special lamp socket operates the main and nightlight bulbs separately, or both together. For those of you who want to build this project but do not wish to scrollsaw the back-lit panels, we provide a source for precut panels. It doesn't get any easier than that!

Note: *To save you the trouble of tracking down all the parts you need to build this lamp, we provide a mail-order source for most of it. Check the Buying Guide before purchasing any hardware.*

Start with the base

1 Plane a ¾×7½×18" board to ½" thick to make a blank for the top and bottom (A) and the brackets (C). Cut the parts to the sizes listed in the Bill of Materials. Set the brackets aside.

2 Chuck a ½" straight bit in your table-mounted router, and adjust it to cut ⅛" deep. Position the fence ⅛" from the bit and clamp stopblocks to the fence to limit your cuts. Lowering the parts onto the running bit, rout the top and bottom perimeter grooves, where shown on **Drawings 1** and **2**.

3 Drill the 5⁄32" corner holes in the top and bottom (A) and the 13⁄32" holes in their centers. Set the parts aside.

4 Rip a ¾×¾×28" blank for the posts (B), then cut the four pieces to length. Drill ⅛" holes in both ends, where shown on **Drawing 3**, **Step 1**. With your tablesaw blade raised ⅛", cut the grooves, where shown in **Step 2**. The ⅛" Baltic birch plywood for the panels (E) varies in thickness, and also will have a layer of rice paper glued to it. Check the plywood's fit in your grooves, and leave some extra room.

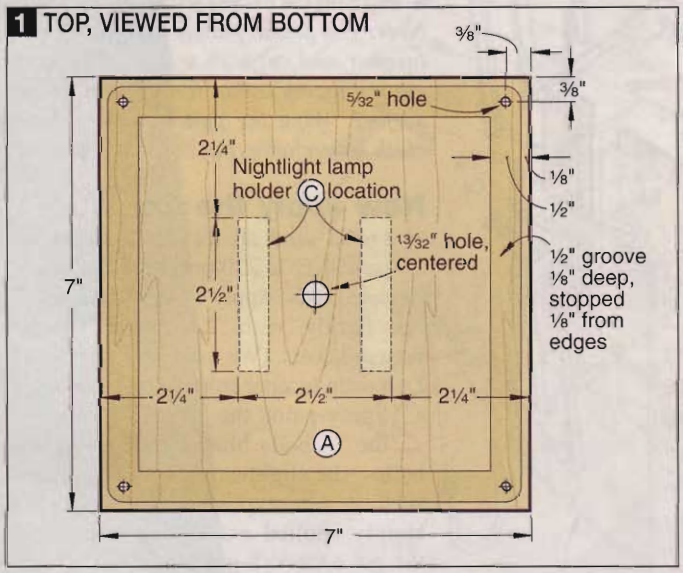
Now use your miter gauge fitted with an auxiliary fence and stopblock to cut rabbets around both ends, forming a short tenon, where shown in **Step 3**. Pare the tenons' outside corners with a chisel to fit the rounded corners of the grooves in the top and bottom.

Finally, cut pieces of threaded rod to length, and epoxy them into the posts' end holes, as shown on **Drawings 4** and **4a**. See the Buying Guide for the threaded rod. Set the posts aside.

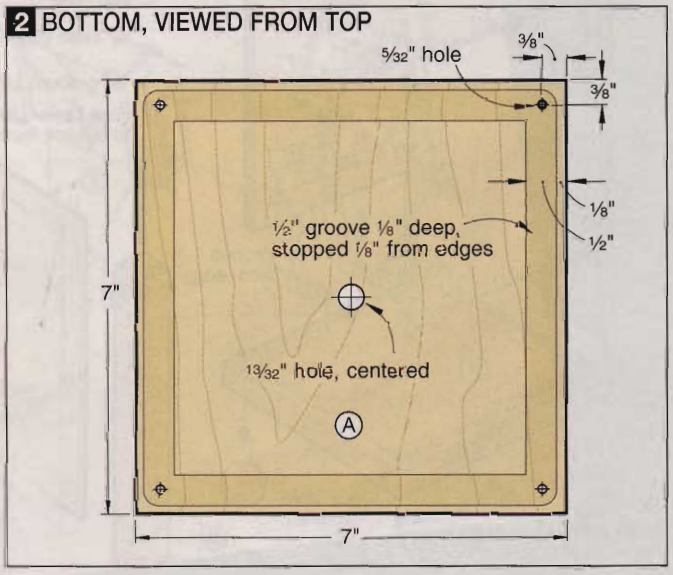
5 Cut the socket holder (D) to size. Use a Forstner bit to drill a centered 1⅛" hole, where shown on **Drawings 4** and **5**. Retrieve the brackets (C), and glue and clamp them to the socket holder. With the glue dry, glue and clamp the brackets/holder assembly to the top, where shown on **Drawing 1**.

6 Use your drill press to drill the holes in the wood balls, as shown in

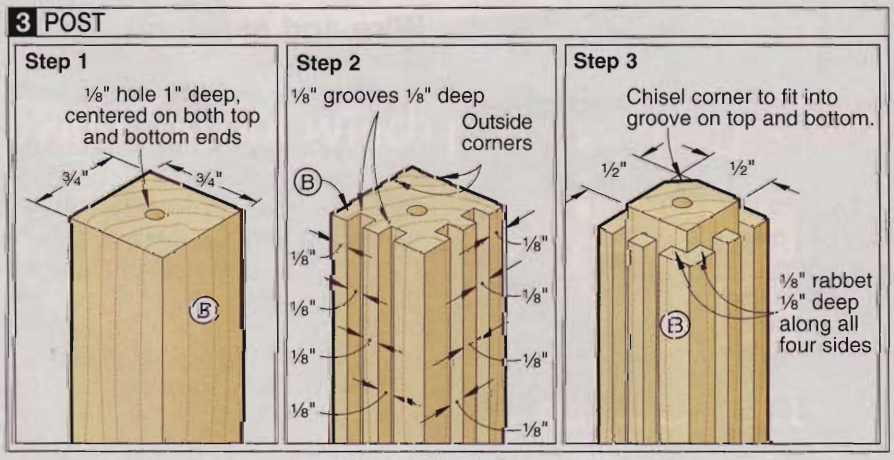
1 TOP, VIEWED FROM BOTTOM



2 BOTTOM, VIEWED FROM TOP

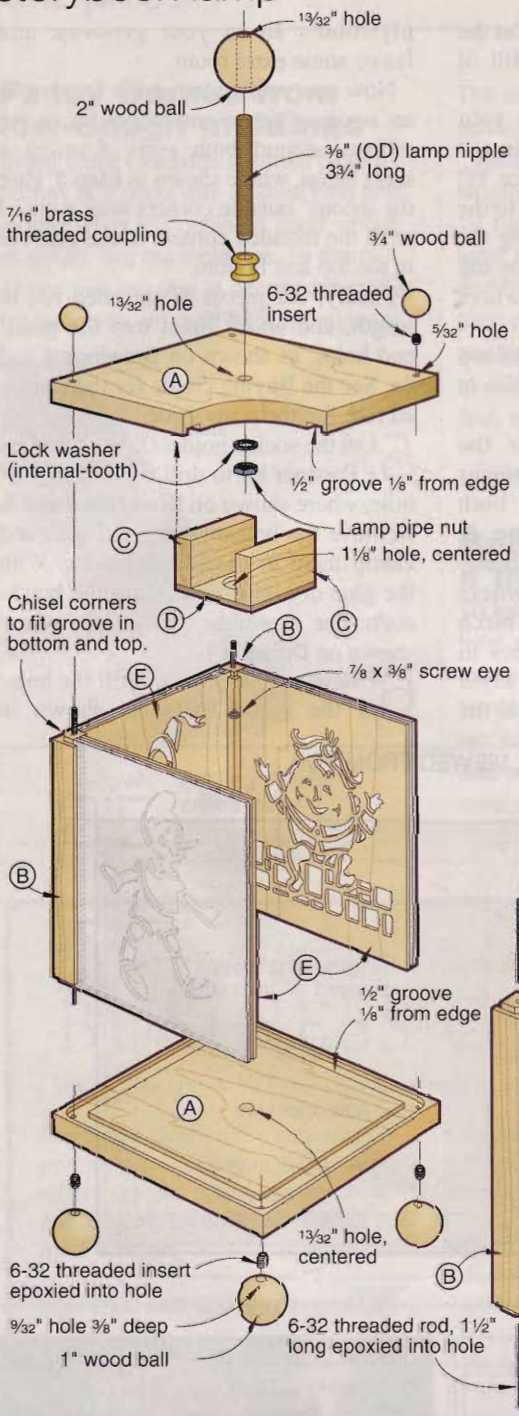


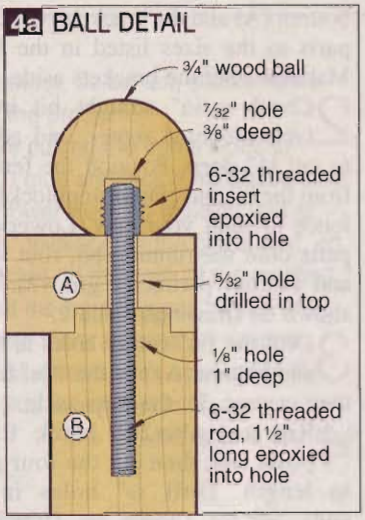
3 POST

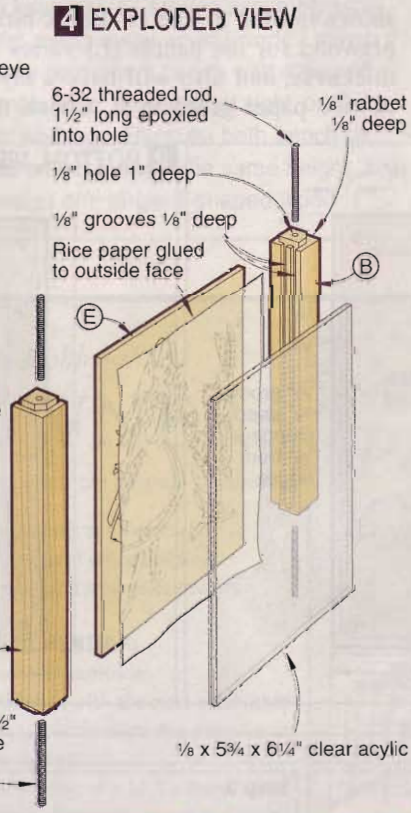


A

A wood handscrew holds the balls securely without marring them.






4 EXPLODED VIEW
6-32 threaded rod, 1½" long epoxied into hole
⅛" rabbet ⅛" deep
⅛" hole 1" deep
⅛" grooves ⅛" deep
Rice paper glued to outside face
B
E
⅛ x 5¾ x 6¼" clear acylic

Drawings 4 and **4a** and **Photo A**. See the Buying Guide for the threaded inserts and wood balls. Rather than trying to thread the inserts into the ¾" and 1" balls, drill the holes so the inserts slip in, then epoxy them in place. Drill all the way through the 2" ball.

7 If you are scrollsawing your own panels (E), cut four ⅛" Baltic birch plywood blanks to size, and four matching pieces of acrylic sheet. Set the acrylic aside. Copy the patterns from the *WOOD PATTERNS®* insert, and adhere them to the plywood blanks with spray adhesive. Drill blade-start holes, and scrollsaw the designs. Remove the patterns. See the Buying Guide for the Baltic birch plywood or our source of precut panels and the acrylic sheet.

8 Cut four pieces of rice paper slightly larger than the panels. (We bought our rice paper at an art supply store.) Apply spray adhesive to the panels. Adhere the paper, as shown in **Drawing 4**, and trim the excess with a utility knife. *Note: The precut panels are sealed with lacquer and cut with a laser. The laser cutting leaves a thin film of soot on the surface. Wipe the panels with a damp cloth before adhering the rice paper.*

Now apply the finish

1 Finish sand all the parts except the panels (E) to 220-grit. Mask the posts' threaded rods. Apply a clear finish, sanding lightly with 220-grit sandpaper between coats. (We used several coats of Deft satin lacquer from a spray can.)

2 Spray-paint the ¾" balls red and the 1" balls blue. Don't prime the balls—the slightest nick in the painted surface can expose the primer. We simply applied extra color coats until we got a smooth glossy finish.

Wire and assemble the lamp

1 Drill screw pilot holes in the inside corner of one of the posts (B), where shown on **Drawings 4** and **5**, and install the screw eyes. See the Buying Guide for the screw eyes. Place the posts in the bottom's corners, and fasten them with the 1" balls.

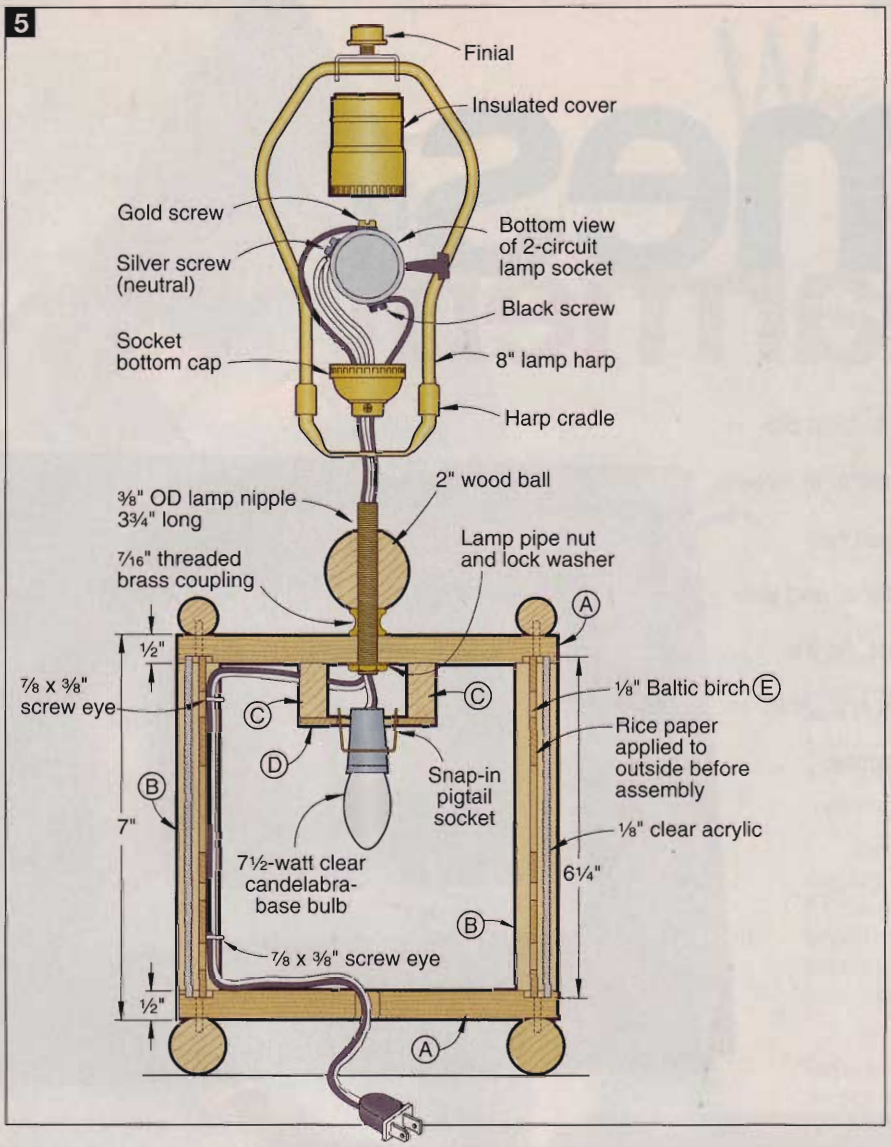
2 Slide the acrylic panels into the posts' outside grooves, and the scrollsawn panels into the inside grooves. The rice paper side faces out.

3 Remove the bottom cap from the lamp socket, screw in the lamp nip-

shop TIP

How to smooth round objects

To hold the 2" ball for sanding, drop it onto a ⅜" bolt and secure it with a hex nut, then chuck the protruding bolt into your drill press. Turn on the drill press and hold sandpaper against the ball, as shown, *right*. To hold the ¾" and 1" balls, chuck a piece of #6-32tpi threaded rod into your drill press. Thread on a hex nut, then the ball, and tighten the hex nut down onto the ball.



Pull the extra cord from the lamp base, leaving enough slack to allow lifting the top for lightbulb replacement. The front panels have been removed for clarity.

ple, and secure it with the set screw. Slip on the lamp harp and the 2" wood ball. Screw on the threaded coupling. Secure this assembly to the top (A) with a lock washer and lamp pipe nut, as shown on **Drawing 5**.

4 Thread the power cord up through the bottom's center hole and the screw eyes. Pull enough cord through to allow you to lay the top/harp/socket assembly on your workbench. Feed the cord through the lamp nipple, pulling about 4" out the top. Feed the snap-in socket's pigtail cord through the holder assembly (C,D) and the lamp nipple. Pull the cord through the nipple, and cut off all but about 4".

5 Strip the wires' ends, and attach them to the socket's screw terminals, where shown on **Drawing 5**. Carefully pull the excess cord back down through the lamp nipple until the lamp socket nestles in the socket's bottom cap. Replace the socket cover. Screw the 7½-watt bulb into the pigtail socket, and snap it into its holder. Lift the top assembly, and pull the extra cord back out the bottom hole, as shown in **Photo B**. Position the top on the base, and secure it with the ¾" balls.

6 Purchase your lampshade and fasten it to the harp with the finial. We chose a royal blue shade that has a lower diameter of 11", an upper diameter of 5", and a height of 7½". Look in your local Yellow Pages under "Lamps and Shades" for a store near you.

Written by **Jan Hale Svec** with **Kevin Boyle**
Project Design: **James R. Downing**
Illustrations: **Kim Downing**; **Lorna Johnson**
Photographs: **Baldwin Photography**; **Wm. Hopkins**

bill of materials

storybook lamp

Part	FINISHED SIZE T	W	L	Matl.	Qty.
A* top/bottom	½"	7"	7"	M	2
B**posts	¾"	¾"	6¼"	M	4
C* brackets	½"	1"	2½"	M	2
D socket holder	⅛"	2½"	2½"	BP	1
E panels	⅛"	5¾"	6¼"	BP	4

*Parts cut from a single oversized ½"-thick blank.
**Multiple parts cut from the same blank.

Materials Key: M–maple, BP–Baltic birch plywood.

Supplies: Spray adhesive, rice paper, epoxy, clear finish, red and blue spray paint, lampshade.

Buying Guide

Note: The ⅛" plywood is not included in the hardware kit. Order either the precut panels or the plain Baltic birch plywood separately.

Hardware Kit: 3-wire turn-knob lamp socket, snap-in pigtail socket, 7½-watt clear candelabra-base bulb, 7/16" threaded brass coupling, 8" lamp harp with lamp nut and finial, 3¾" threaded nipple, lock tight washer, 8-foot cord set, ⅞x⅜" screw eyes (2), ¾" wood balls (4), 1" wood balls (4), 2" wood ball, 6-32x12" threaded rod, 6-32 threaded inserts (8), 12x12" clear acrylic (2). Order kit no. 6302, $29.95 plus $7.99 shipping and handling. MN residents add $1.95 tax. Meisel Hardware Specialties, P.O. Box 70W, Mound, MN 55364-0070. Or call 800/441-9870, outside the U.S. call 952/471-8550.

Baltic Birch Plywood: ⅛x12x12" Baltic birch plywood no. 9559, $1.40 each (2). Add to the hardware kit above.

Precut Panels: Set of four panels laser cut from ⅛" Baltic birch plywood, Kit no. LZ-LAMP, $20.00 ppd. Call Drico Products, Inc., 888/577-3257.

frames of endearment

When it comes to displaying your favorite pictures, presentation counts. Designed to fit three sizes of standard, precut mats, these two designs feature a minimum of material and simple construction for maximum effect. As the examples show, contrasting woods and grain figure combine to create unique frames.

prairie frames

Flat surfaces and simple bevels, rather than intricate molding profiles, put the wood's grain and figure on display in these frames. Shown *far left* and *above*, fiddleback maple is enhanced with a dark aniline dye. In the other two frames, flatsawn and quartersawn woods combine for a subtle contrast in white oak, *near left*, and Honduras mahogany, *below*.

beaded frames

Simple beaded bands flanking a flat field are a perfect vehicle for showing off contrasting wood species. Bubinga beads sandwich lacewood, *above*. The wenge beads complement the dark streaks in the spalted maple field, *right*. At *far right*, straight-grained ash bordered with cherry looks better and better with age.

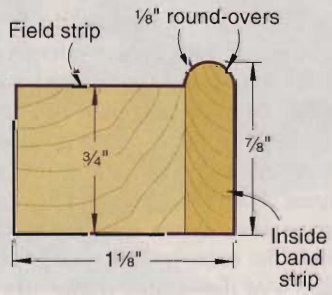
Making the beaded frame

1 Select your species and prepare your stock. You'll need a ½×1⅛" piece for the outside band, a ¾×⅞" piece for the field, and a ¼×⅞" piece for the inside band. See the Sizing Guide for the stock length needed for each size of frame.

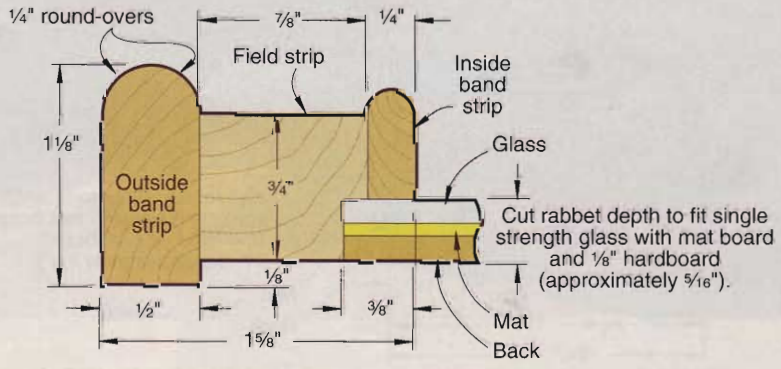
2 Chuck a ⅛" round-over bit in your table-mounted router, and rout the edges of the inside band strip, as shown in **Drawing 1** and **Photo A**. Then change to a ¼" round-over bit, and rout the edges of the outside band strip, as shown in **Drawing 2**. Finish-sand the strips to 220 grit before assembly.

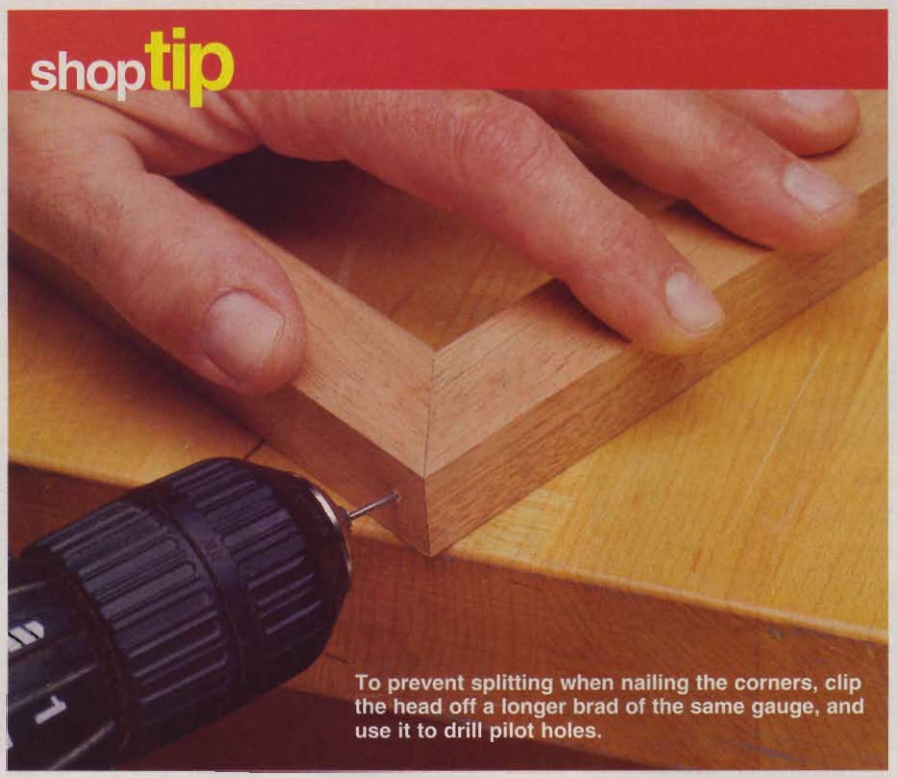
For safe operation and uniform results, use featherboards when routing the band round-overs.

1 BEADED FRAME SUBASSEMBLY



2 BEADED FRAME CROSS SECTION





To prevent splitting when nailing the corners, clip the head off a longer brad of the same gauge, and use it to drill pilot holes.

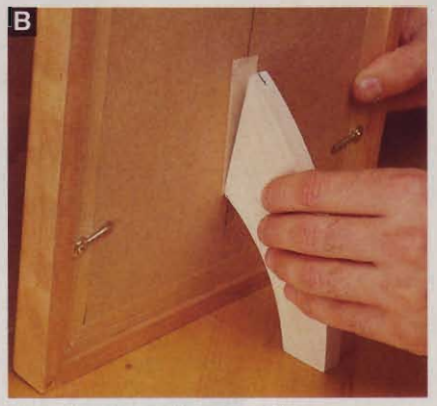
3 Glue and clamp the inside band strip to the field strip, as shown on **Drawing 1**. When the glue dries, chuck a rabbeting bit in your table-mounted router, and rout the ⅜"-wide rabbet, where shown on **Drawing 2**.

4 Cut the assembled inside band/field strips into lengths about 1" longer than the dimensions shown under Inner Frame Size in the Sizing Guide. Miter-cut them to the inner frame dimensions. Glue and clamp the inner frame together, checking for squareness. We used a band clamp. When the glue dries, reinforce the corners with wire brads.

5 Miter-cut the outside bands to fit around the inner frame, and finish-sand them. Lay the inner frame on your workbench with ⅛" spacers underneath it. Glue and clamp the bands in place, creating a ⅛" recess at the frame's back.

6 Cut glass and ⅛" hardboard to fit the rabbeted opening. Stack the glass, precut mat, and hardboard in the frame. Drill screw pilot holes, and attach the turnbuttons. See the Buying Guide for our turnbutton source. We used two turnbuttons on only the long sides of the small and medium frames, and two turnbuttons on all sides of the large frame.

7 For a wall-hung frame, attach a sawtooth type picture hanger to the frame's back after the finish is applied. To make your frame freestanding, make a copy of the appropriate stand from the *WOOD PATTERNS*® insert. Adhere it to a piece of ½" stock with spray adhesive, and saw and sand the stand to shape. Mark the center of the hardboard back and the top of the stand. Stick a piece of double-faced tape to the back, and temporarily adhere the stand to the back, as shown in **Photo B**. Remove the back and attached stand from the frame, and drill pilot and countersunk shank holes for the screws. Separate the stand from the back, remove the tape, and screw the stand in place, as shown on **Drawing 3**.



With the end of the stand flat on your benchtop, tip the frame against it, adhering the stand to the tape on the back.

8 Prime the back with spray primer, then finish with two coats of satin black spray paint. Remove the turnbuttons and apply two coats of clear satin finish to the frame, sanding lightly with 220-grit sandpaper between coats.

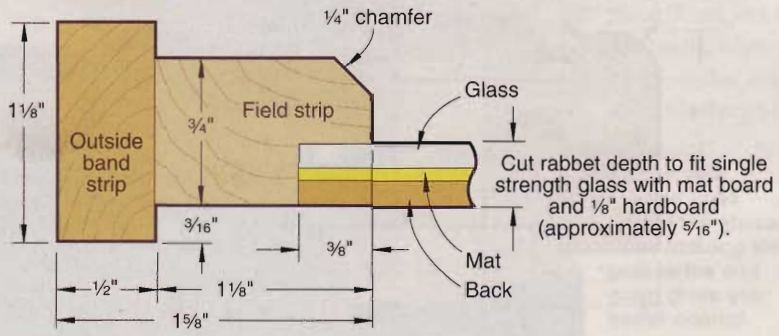
Try the prairie frame

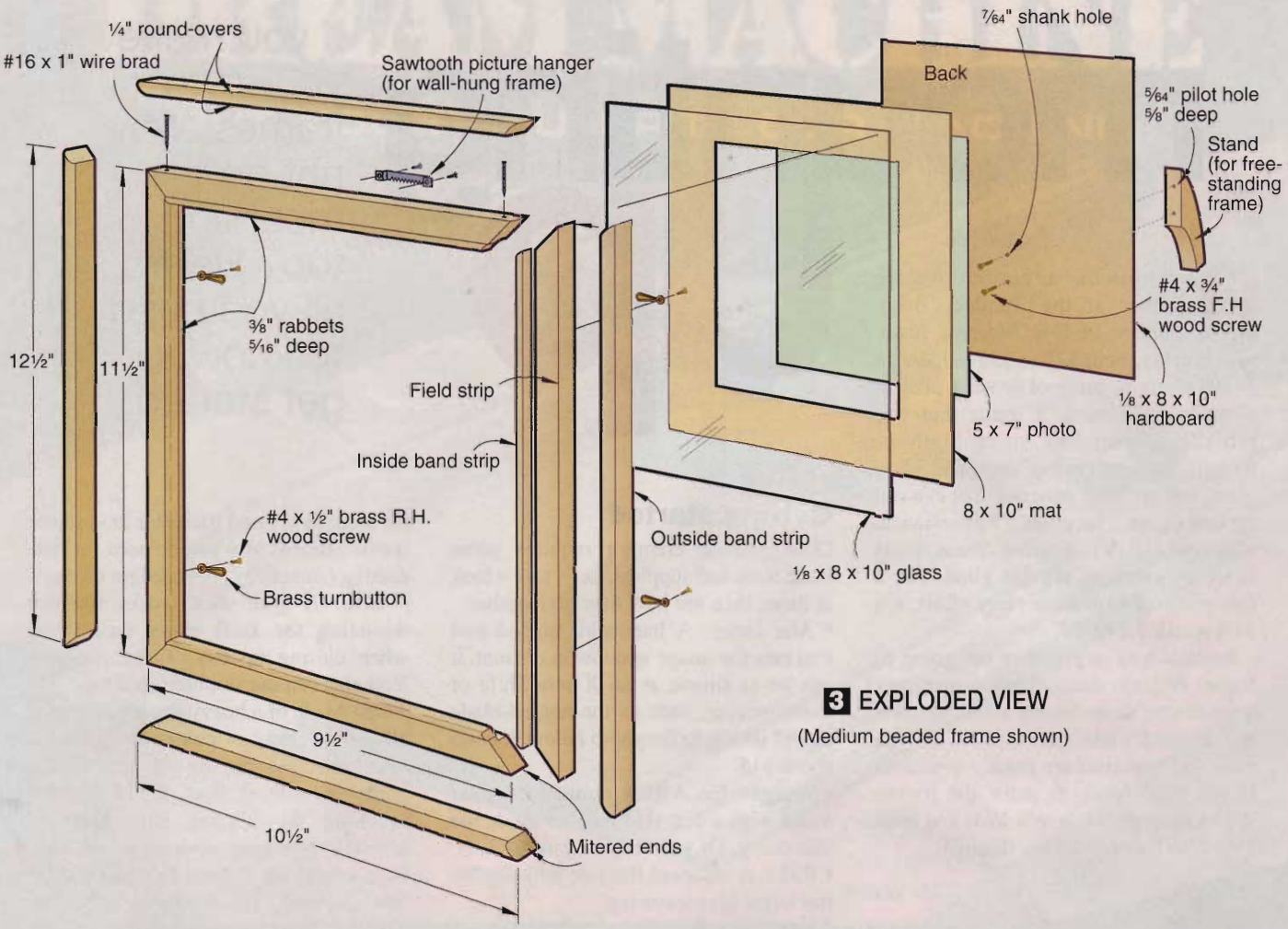
1 Select your species and prepare your stock. You'll need a ½×1⅛" piece for the outside band and a ¾×1⅛" piece for the field. See the Sizing Guide for the stock length needed for each different size of frame.

2 Chuck a chamfer bit in your table-mounted router and rout the edge of the field strip, where shown on **Drawing 4**. Then change to a rabbeting bit, and rout the ⅜" rabbet. Finish-sand the field strip.

3 Cut the field strip into lengths about 1" longer than the dimensions shown under Inner Frame Size in the Sizing Guide. Miter-cut them to the inner frame dimensions. Glue and clamp the inner frame together, checking for squareness. When the glue dries, reinforce the corners with wire brads, as in Step 4 of the beaded frame instructions and the shop tip.

4 PRAIRIE FRAME CROSS SECTION





3 EXPLODED VIEW
(Medium beaded frame shown)

4 Miter-cut the outside bands to fit around the inner frame, testing the fit of each piece as you proceed. Finish-sand them to 220 grit. Lay the inner frame on your workbench with 3/16" spacers underneath it. Glue and clamp the bands in place. The spacers create a 3/16" recess at the frame's back.

5 Now, to add the glass, mat, back, turnbuttons, hanger or stand, and finish to your prairie frame, follow Steps 6, 7, 8 of the beaded-frame instructions.

Written by **Jan Hale Svec** with **Kevin Boyle**
Project designs: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**
Photographs: **Baldwin Photography**

sizing guide

FRAME	STANDARD MAT	PHOTO SIZE	MAT OPENING	OVERALL FRAME SIZE	INNER FRAME SIZE	STOCK LENGTH
LARGE	11 x 14"	8 x 10"	7½ x 9½"	13½ x 16½"	12½ x 15½"	65"
MEDIUM	8 x 10"	5 x 7"	4½ x 6½"	10½ x 12½"	9½ x 11½"	51"
SMALL	5 x 7"	3½ x 5"	3 x 4½"	7½ x 9½"	6½ x 8½"	39"

Supplies: #4x½" brass roundhead wood screws, #4x¾" brass flathead wood screws, #16x1" wire brads, turnbuttons, sawtooth picture hanger, ⅛" hardboard, single-strength glass, glue, primer, paint, finish. Precut mats in standard sizes are available at art supply and craft supply stores and frame shops.

Buying Guide: You can order no. 6293 brass-plated turnbuttons, $2.49/20 or $9.95/100 from Meisel Hardware Specialties. Call 800/441-9870.

Do you have a special picture to frame, one that won't fit into a standard frame and precut mat? The article "Mount Up" on page 78 *gives you all the information you need to do a professional job of matting and mounting your artwork, no matter what size frame you make. We even share the technique for cutting your own glass.*

mounting up

If you make your own frames, why not do the mounting, too? Here's all you need to know to get started.

Rick Smith, a custom picture framer at the Tandem Brick Gallery in Des Moines, Iowa, says it costs about $25 to $35 to have an 8×10" photo or piece of artwork professionally mounted in a frame that you provide. "There are many options, though, such as type of mat, non-glare glass, and archival material, that can run up that figure," he notes. "For instance, ultraviolet [UV] filtering glass costs twice as much as regular glass. For a rare photo or expensive piece of art, it's well worth the cost."

Because you're probably not going to frame Picasso sketches, you just may want to save some money and do it yourself. It doesn't take special skills, and the tools and materials are readily available. If you're planning to make the frames shown on *page 74*, here's what you need to know to follow through.

Getting started

Do-it-yourself framing requires some basic tools and supplies. Let's take a look at them, then see how they go together.

- *Mat cutter.* A handheld, bladed tool that cuts the image window in the mat. It can be as simple as an X-acto knife or more precise, such as the angled-blade model shown in the photo *below.* It costs about $15.
- *Straightedge.* A thick, straight length of metal with a non-skid back to guide the mat cutter. Or you can use a metal ruler.
- *Ruler.* A standard flat rule with legible markings for measuring
- *Pliers.* Use the adjustable-jaw type for pushing in brads.
- *Awl.* A pointed tool for piercing a wood frame for brad starter holes. The awl also can be used for burnishing (smoothing) bevel edges on mats.
- *Glue.* A glue stick works fine for mounting the kraft paper dust cover when closing up the picture package. You also can use double-faced tape.
- *Mat.* Made of a heavy paperboard, usually in a variety of colors and textures, mats surround the image area of the photo or artwork and protect it from touching the glazing (the glass or acrylic). Normally, mat material contains a high rag content to make it acid-free (labeled "ph neutral"). Acid-free material prevents deterioration of the photo or artwork. Art supply stores carry precut mats in a variety of traditional sizes and colors, or will custom cut a mat to fit the image you have.
- *Mounting board.* The same heavyweight paperboard as mats, mounting boards can be acid-free as well because the photo or artwork is mounted on it.
- *Backing board.* Usually made of a stiff cardboard to strengthen the mounting board, backing boards more recently are made from rigid foam-core stock approximately ¼" thick or thicker. They come in white and many colors, and in full sheets or pre-cut sizes.
- *Dust cover.* Cut from kraft paper (like a grocery bag), dust covers are adhered to the back of a frame to keep out dust and give it a finished look. It also comes in black.
- *Acid-free tape.* Small pieces of this tape adhere the photo or artwork to the mat or mounting board, so it's normally of acid-free, linen cloth. There also is acid-free, double-faced tape.

Glazing tops the image

• *Glass.* Window glass works fine. It's sold in common thicknesses of 3/32" to 1/2". The 3/32" thickness—standard window glass—performs okay for the glazing in picture framing. (See the sidebar "Glass cutting—it's slick!" on the *next page.)* Special picture-framing glass is 1/16" thinner than regular glass. You'll find it available (at framing shops and glass suppliers) in several grades: standard clear, premium clear or ultraclear, non-glare, conservation clear (it blocks ultraviolet light rays), and a special conservation non-glare.

• *Clear acrylic.* It also comes as non-glare. Cost is about half that of top-grade picture glass, but it does scratch. It also attracts dust, so don't use it over artwork done in pastel, pencil, or charcoal because it will deteriorate the work. But it reduces the weight when used over large posters or other sizable artwork.

Hardware to hold

• *Brads.* These small nails, up to 1" long, are pushed into the rabbeted recess at the back of the wooden frame to hold the contents in place. A commonly employed size is #18, 5/8" long.

• *Glazer's points.* Exactly like the points used in window glazing, these points can be set with a screwdriver. Another version, called framer's points, are flat metal tabs, often flexible. To use these, though, you need a special tool. Professionals use a point driver—similar to a staple gun—that costs about $70. A simpler point inserting tool is about $40.

• *Turn buttons.* Screwed into the back of the frame, these flattened, tear-drop shaped buttons (shown on *page 77)* can be pivoted back and forth for quick placement and replacement of the contents without tools. Use of these precludes a dust cover.

Hardware to hang

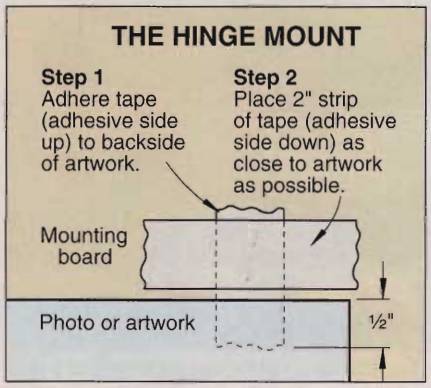
• *Screw eyes.* Traditional hardware, screw eyes (typically 3/4" long) are looped, threaded screws to which you tie hanging wire on frames up to 16×20". One goes on either side of the frame about one-third of the way from the top. You'll want to use self-adhesive rubber bumpers on the frame bottom to keep the picture parallel with the wall.

• *Strap hanger/D-ring.* Able to carry more weight than screw eyes, strap hangers/D-rings are metal tabs with a D-or trangle-shaped ring. After fastening them to the frame with self-tapping wood screws about 6" down from the top frame edge, you string picture wire between them and secure it.

• *Saw-toothed hangers.* Metal bars with a notched edge, saw-toothed hangers are used in place of hanging wire for lighter frames. They're the easiest to install and adjust for level.

• *Hook hangers.* These metal hangers are installed on a wall with a small nail, and incorporate a hook over which you loop the frame's hanging wire. It's best to use these in pairs, stringing the picture wire over each to distribute the weight and keep the picture from shifting.

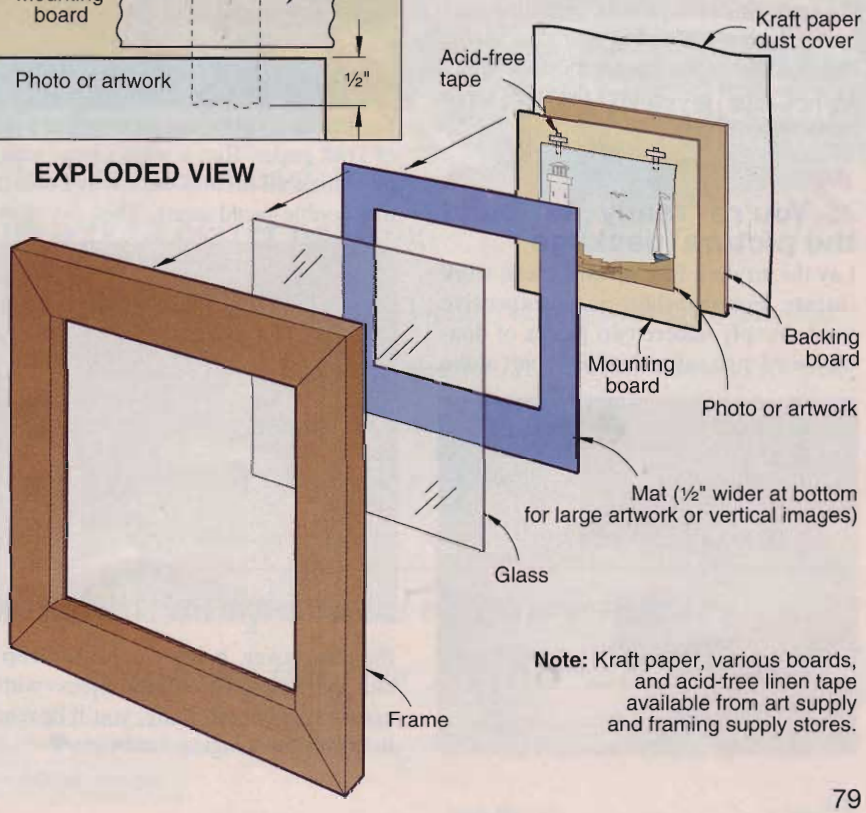
• *Picture wire.* This twisted, small diameter wire stretches between the hangers and goes over the wall hook to suspend the framed piece. Do not use wire to hang a mirror or a very heavy picture. These should be hung on strap hangers directly over hook hangers.


THE HINGE MOUNT
Step 1
Adhere tape (adhesive side up) to backside of artwork.
Step 2
Place 2" strip of tape (adhesive side down) as close to artwork as possible.
Mounting board
Photo or artwork
1/2"

How to assemble a picture-package

What framers refer to as the "picture package" (see the drawing *below*) consists of the glazing, the mat, the photo or artwork, the mounting board, a backing

continued on page 80



Note: Kraft paper, various boards, and acid-free linen tape available from art supply and framing supply stores.

board, and kraft paper as a dust cover to seal it. Here's how to put it all together.

1 Cut the mat

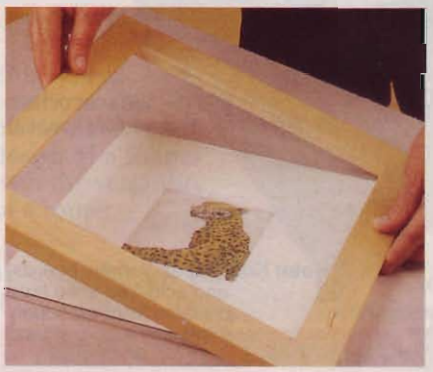
Select a mat sized to fit your frame, or cut one from larger stock. Measure the image area of your artwork, allowing for a small border around it if you wish. With a pencil, lightly draw the cutout lines on the back of the mat (erase them later). Depending on the size of your image area and your preference, you

might want to make a ½" wider border at the bottom of the mat. This is especially true for large (greater than 11×14") or vertical-image pictures.

Now, clamp down one end of your straightedge so that the mat cutter follows the pencil line. Begin the cut ⅛" beyond the intersecting lines, and end it the same distance past the next intersection. (With a mat cutter's angled blade, this completes the cut on the face side.) Follow this procedure for the three remaining sides

2 You're ready to build the picture package

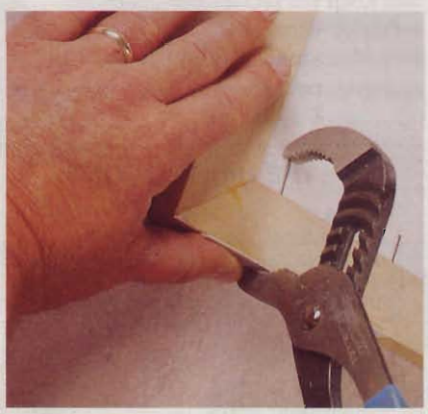
Lay the artwork face up on a clean work surface. For snapshots and inexpensive work, simply adhere two pieces of double-faced tape several inches apart at the



top of it. Then position the mat over the image area and press in place. For valuable art or treasured photos, use the "hinge" method shown in the drawing on the *preceding page* to secure the mat to the mounting board, then sandwich the artwork between them. Next, build up the rest of the picture package, and set the frame over it to check for fit. If it's okay, turn the unit over.

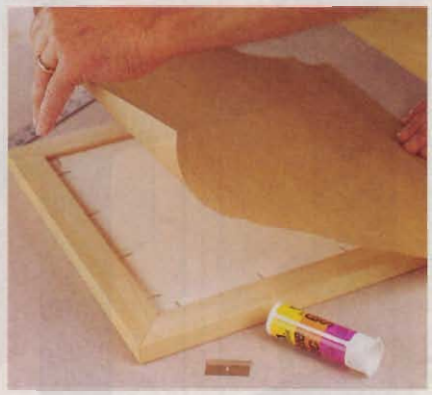
3 Secure it

Using adjustable pliers and a scrap of mat board for a jaw pad, begin inserting the brads into the frame about 3" apart and 1" in from each corner. Keep them as tight as you can against the backing board. (If you like, you also can "predrill" brad holes with the tip of a sharp awl.)



4 Seal it up

For the dust cover, cut an oversize piece of kraft paper. Run a wide smear with a glue stick all around the frame back (or use double-faced tape). Then lay down

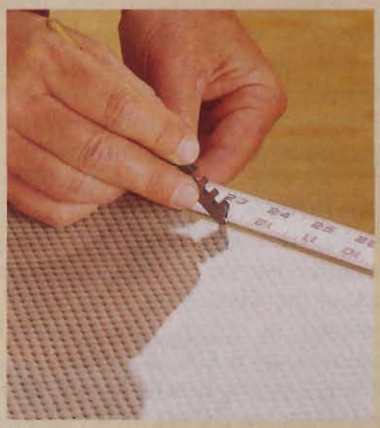


the dust cover, being careful to keep it taut. After you trim off the excess with a razor blade or craft knife, you'll be ready to install the hanging hardware.

Glass cutting—it's slick!

There's really nothing much to cutting glass in your own workshop. To start with, you'll need a glass cutter (a serviceable one is about $5) and mineral spirits. Then you must have a straightedge, such as a metal ruler; glass cleaner; and two spring clamps—plus eye protection

First, clean the glass. Next, place it on a flat, clean, cushioned surface, and clamp the ruler to the glass where you want to make the cut (actually a score line). Now, see the photos *below*.



With the straightedge clamped in place, brush mineral spirits on the glass. Holding the glass cutter as shown and starting at one edge of the glass, draw it firmly across to the other edge.

To easily and safely separate the glass, first turn the piece over and set it down carefully. Then, turn the cutter handle down, and use it to tap edge to edge on the visible score line. The glass will separate cleanly as you move along.

Written by **Peter J. Stephano**
Illustrations: **Roxanne LeMoine**
Photographs: **Baldwin Photography**

products that perform

These woodworking wares passed our shop trials

Ratcheting clamps that reach around

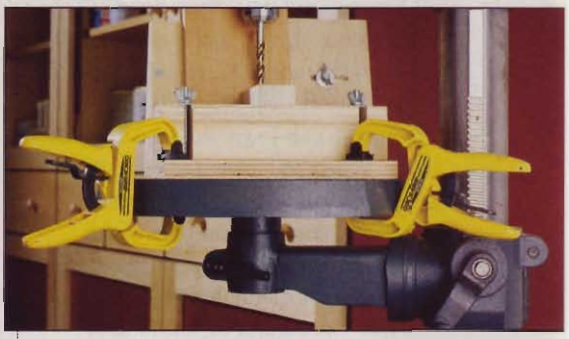
If you've ever tried to clamp an auxiliary table or jig to your drill-press table or oscillating spindle sander, you know the gussets under the table rarely match up with where you want to put your clamps. Quick-Grip Handi-Clamps might solve the problem.

The pivoting jaws of these clamps open to 2", but the real improvement over spring clamps lies in the shape of the throat. Like a C-clamp, the opening behind the jaws is about 1⅛" larger, per jaw, than the jaws themselves. That made it easy for me to reach around the rim of my drill-press table to attach a jig.

Quick-Grip Handi-Clamps also use a steel rack-and-pawl system between the handles so you control the amount of clamping pressure. I used the ratcheting action to pick up a blown-glass figurine. A spring clamp would have crushed the fragile knickknack, but, much to my wife's relief, the clamp gave me just enough pressure to grasp it harmlessly.

The only test these clamps didn't pass with flying colors was clamping stops to a tool fence, such as on a radial-arm saw or mitersaw. Play between the jaws allowed the stop to shift as much as ⅛" when bumped, resulting in less-than-absolute repeatability.

—Tested by Jeff Hall

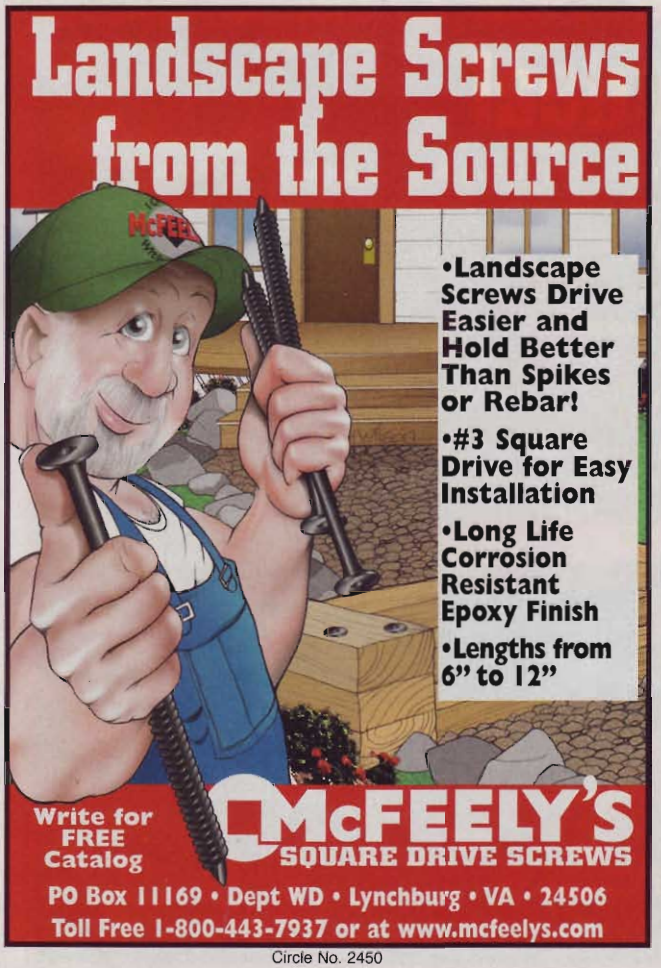


Quick-Grip Handi-Clamps

Performance	★★★★☆
Price	$6
Value	★★★★★

Call American Tool Company at 847/478-1090, or visit www.americantool.com.

Continued on page 84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Salute the Drill Sargent

In the Army, you never call your drill sergeant "sir" because that title is reserved for officers. If you slip up, Sarge reminds you, "I *work* for a living!" So does the Drill Sargent drill-press hold-down.

Once mounted to the quill of your drill press (you lose about ¾" of quill travel to the bracket), set Drill Sargent's spring-loaded foot a hair lower than the tip of the drill bit. When you lower the quill, the foot presses the workpiece to the table while the bit continues into the wood.

To test its limits, I used the device while boring a 2"-diameter hole in walnut at 1,250 rpm—not a task for the faint of heart. The workpiece, which was not backed by a fence, slipped only a little. If you need a lighter touch for softer woods, adjust the pressure from its 180-pound max down to 30 pounds.

I had to remove the threaded-rod depth stop from my old Craftsman drill press to mount Drill Sargent. But the accessory has its own built-in depth stop to do the job instead.

Setting the device to the most effective height (or removing it completely) requires a hexhead wrench, and that's my only real beef about the Drill Sargent. That's a frequent adjustment, and the wrench is easier to lose than a chuck key.

You may not want to take the time to readjust the hold-down for only one or two holes: Clamping is quicker in those cases. But when you need your drill press to drop and give you twenty (plugs, shelf-pin holes, mortises, etc.), this Drill Sargent is a four-star general.

—Tested by Rich Bright

Drill Sargent

Performance	★★★★☆
Price	$90
Value	★★★★☆

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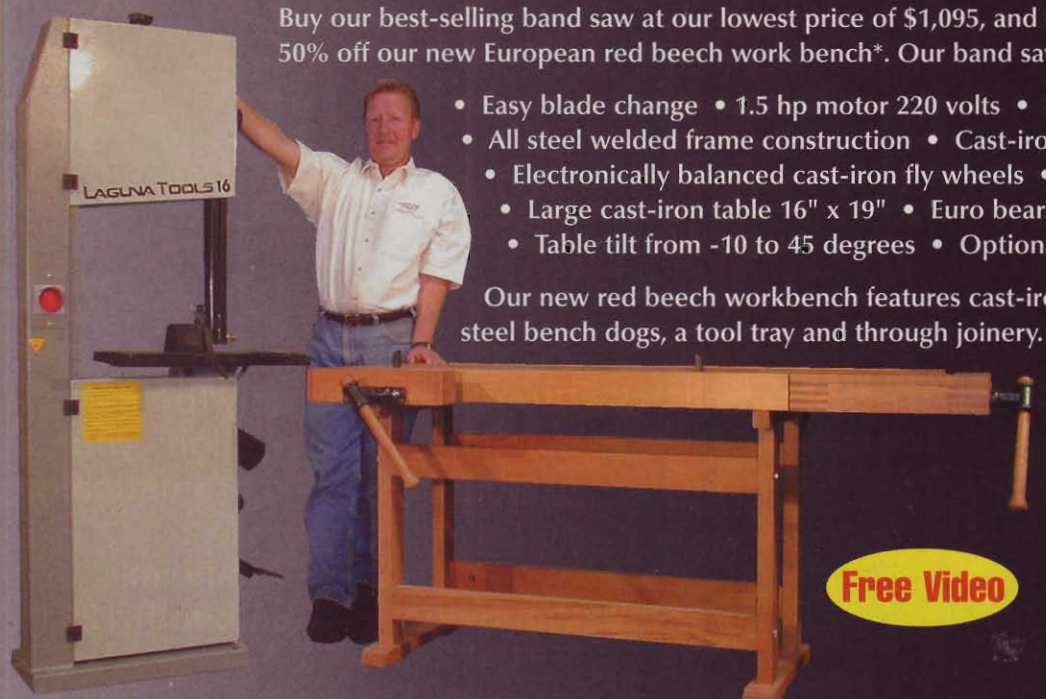

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wood
anecdote

longleaf pine

the deep South's fast-growing, do-everything tree

ILLUSTRATION: BRIAN JENSEN

Where longleaf pine grows, wild hogs prove one of its worst enemies.

Second only to Douglas fir in the nation's storehouse of trees, longleaf pine (*Pinus palustris*) has for centuries been the mainstay of the southern forest products industry. In ideal conditions it attains 100' with a trunk up to 3' in diameter. In a range that extends from North Carolina to east Texas, longleaf pine grows quickly. At five years of age, saplings begin a 35- to 50-year surge that produces trees to 80' tall.

True to its name, this tree has the longest needles of any conifer—up to 20"! It's longleaf pine's wood, though, that attracted loggers' attention. Hard, heavy, strong, and durable, its yellowish-orange heartwood (which prompts the common title "yellow pine") has been used for everything from building beams and bridge girders to flooring, ship masts, spars, and railway ties. Together with slash pine, longleaf pine also has been a major contributor of its resinous gum for such products as turpentine, printing ink, varnish, and paint.

Today, however, a great percentage of longleaf pine, as well as loblolly, shortleaf, and slash pine—all commercially grouped as "southern pine"—are harvested to become pressure-treated lumber and timbers. In fact, because of their ease of treatability, longleaf pine and its three cousins comprise about 85 percent of all pressure-treated lumber.

In spite of this, the fast-growing and versatile longleaf pine has not lacked natural enemies. Among insects, the southern pine beetle rates as Enemy Number One. Fire, too, can lay waste a longleaf pine forest, especially if its trees have been tapped for gum—the dried resin covering the scars easily ignites. And surprisingly—although naturally enough—wild hogs display an appetite for the roots of young longleaf pine trees. One "razorback" can ravage 100 or more in a day.

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what's ahead

in our next issue

Coming in October—we'll show you how to upgrade your home's most active room...the kitchen!

Here's a high-style window treatment

Transform a ho-hum standard window into a fashion statement. A false transom gives more height and a whole new look.

Craft a classy countertop

Why settle for the commonplace when it's so simple to create a custom look? You'll go through the countertop-making process from A to Z.

Ready for new cabinets?

You'll be surprised by how easy it is to build and install frameless kitchen cabinets when you do it like the pros.

Why not make 'em match?

Would you believe there's a dishwasher behind this panel? We show you how to camouflage your dishwasher and refrigerator as cabinetry. And it's a whole lot easier than you might think.

Also included in the October issue:

Our bedroom set continues

If you love the sleigh bed in this issue, you'll fall head over heels for it's matching nightstand.

Drill presses anyone?

Get an in-depth, honest look at several popular floor models. See how we rate them.

Historic Chippendale mirror

Build this mahogany reproduction from the one-time home of Revolutionary War patriot Patrick Henry.